

General Disclaimer

One or more of the Following Statements may affect this Document

- This document has been reproduced from the best copy furnished by the organizational source. It is being released in the interest of making available as much information as possible.
- This document may contain data, which exceeds the sheet parameters. It was furnished in this condition by the organizational source and is the best copy available.
- This document may contain tone-on-tone or color graphs, charts and/or pictures, which have been reproduced in black and white.
- This document is paginated as submitted by the original source.
- Portions of this document are not fully legible due to the historical nature of some of the material. However, it is the best reproduction available from the original submission.

NASA CR-144946-3

Part 3 of 4

A COMPILATION OF SPACECRAFT LOADS DATA
FROM
FOUR TITAN CENTAUR LAUNCH VEHICLE FLIGHTS

VOLUME III: SHOCK SPECTRA OF TRANSIENTS

Compiled by: George Kachadourian

(NASA-CR-144946-Pt-3) A COMPILATION OF
SPACECRAFT LOADS DATA FROM FOUR TITAN
CENTAUR LAUNCH VEHICLE FLIGHTS. VOLUME 3.
PART 3: SHOCK SPECTRA OF TRANSIENTS
(General Electric Co.) 126 p HC A07/MF A01 G3/15

N77-28188

Unclas
42482



Prepared under Contract No. NAS1-9100 by
GENERAL ELECTRIC COMPANY
Viking Project Support Services
Hampton, Va. 23666

for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

January 1977

VOLUME III
SHOCK SPECTRA OF TRANSIENT EVENTS
SECTION 3

TC-4 Launch ----- Viking A Spacecraft

Launch Date August 20, 1975

<u>Contents</u>	<u>Page</u>
Description of Contents	3.1
Table 3.1: Data Analysis Matrix	3.2
Table 3.2: FM/FM Telemetry Instrumentation	3.3
Table 3.3: Time of Flight Events	3.4
Figure 3.1: Instrument Location	3.5
 Data	 Figure No.
Stage 0 Ignition	3.2a - 3.13b
FBR Release	3.14a - 3.17b
Stage 1 Ignition	3.18a - 3.29b
Stage 1 Burnout	3.30a - 3.41b
Jettison Shroud	3.42a - 3.53b
Titan Centaur Separation	3.54a - 3.57b
MECO-2	3.58a - 3.61b
	3.6 - 3.29
	230 3.30 - 3.37
	3,3 3.38 - 3.61
	3,6 3.62 - 3.84
	3,8 3.85 - 3.108
	3,1 3.109 - 3.116
	3,137 117 - 3.124

Description of Contents - Section 3, Viking A Shock Spectra

This appendix presents shock spectrum analyses of the parameters listed below for the booster transient events listed in Table 3.1. All booster transients were not analyzed, the milder events being omitted. Measurements and measurement locations are shown in Table 3.2 and Figure 3.1.

Parameters for which Analyses were Performed

Parameter	Description
CY1820 CY1830 CY1840 CY1850	Vibration measurements on the Viking Orbiter Bus; CY1830 is transverse, all others are longitudinal.
XDDL YDDL ZDDL	Acceleration of the Viking Lander Capsule (VLC) c. g. obtained through transformation of VLCA strain data assuming rigid VLC (Strain data is phase correlated to 40 Hz)
ZDDB	Average of phase correlated longitudinal vibration measurements.

TABLE 3.1 DATA ANALYSIS MATRIX: TC-4 SHOCK SPECTRA

Event & Time	Data Item				$\ddot{X}_L$	$\ddot{Y}_L$	$\ddot{Z}_L$	$\ddot{Z}_B$
	CY1820	CY1830	CY1840	CY1850				
Stg 0 Ign. 76920.1 (~ T + 0)	A&B	A&B	A&B	A&B	A	A	A	A
FBR Release 77020 (T + 100)	B	B	B	B				
Stg 1 Ign. 77030 (T + 110)	A&B	A&B	A&B	A&B	A	A	A	A
Stg 1 BO 77178.8 (T + 258.8)	A	A	A	A	A	A	A	A
Jett Shroud 77190 (T + 170)	A&B	A&B	A&B	A&B	A	A	A	A
Titan/ Centaur Sep. 77393.8 (T + 473.8)	B	B	B	B				
MECO 2 78766.1 (T + 1846.1)	B	B	B	B				

A = Shock Spectrum of 1024 sps data

B = Shock Spectrum of 4096 sps data

$$\ddot{X}_L \equiv \text{XDDL}$$

$$\ddot{Y}_L \equiv \text{YDDL}$$

$$\ddot{Z}_L \equiv \text{ZDDL}$$

$$\ddot{Z}_B \equiv \text{ZDDB}$$

TABLE 3.2 FM/FM TELEMETRY INSTRUMENTATION, 2208.5 MHz LINK, TC-4

MEAS. NO.	DESCRIPTION	JPL DESIGNATION	RANGE		U N I T S	A C C U R A C Y	FM/FM CHANNEL	FILTER CUT OFF FREQUENCY - Hz	
			LOW	HIGH				A 1024 SPS	B 4096 SPS
CA886Y	Fwd.Equip.Comp.Amb.	-	120	150	db	5%	19	—	2800
CY182Ø	Longit.Vib; Foot H	2001AC1	-30	30	G	5%	18	133	2100
CY183Ø	Radial Vib.; Bay 7/8	2001AC2	-12	+12	G	5%	17	134	1580
CY184Ø	Longit. Vib., Foot C	2001AC3	- 5	+ 5	G	5%	16	135	1200
CY185Ø	Longit. Vib., Foot R	2001AC4	- 5	+ 5	G	5%	15	137	900
CY186S	VLCA #750 Strain 1	2001SG1	10000C	8000T	Lbs	5%	14	140	—
CY187S	VLCA #751 Strain 2	2001SG2	10000C	8000T	Lbs	5%	13	145	—
CY188S	VLCA #752 Strain 3	2001SG3	10000C	8000T	Lbs	5%	12	153	—
CY189S	VLCA #753 Strain 4	2001SG4	10000C	8000T	Lbs	5%	11	160	—
CY190S	VLCA #754 Strain 5	2001SG5	10000C	8000T	Lbs.	5%	10	180	—
CY191S	VLCA #755 Strain 6	2001SG6	10000C	8000T	Lbs.	5%	9	200	—
CY192P	VLC Bioshield DP		-0.25	0.75	PSID	5%	4	—	—
CY193P	VLC Bioshield Press.		0	16	PSIA	5%	3	—	—

① Range shown is max limit. Each gage will have a different range dependent on its calibration value.

A. This is a special set of filters which, in conjunction with discriminator characteristics, results in phase errors of less than 1° between VCO 9 through 18 below 40 Hz

B. These are twice the standard IRIG filter.

TABLE 3.3 - TIME OF FLIGHT EVENTS: VIKING A, TC-4 (Launch Date 8/20/75)

FLIGHT EVENT	Predicted Sec from LO	Actual Hrs Min Sec	Actual Seconds	From Stg O Ign Seconds	From Stg I Ign. Seconds	
1 STG O IGN. /LO	0	21:22.00. *	76920	0	-	
2 MACH 1/MAX Q	50	21:22:38	76958	38	-	
3 FBR RELEASE	100	21:23:40.2	77020.2	100.2	-	
4 STG I IGN	110	21:23:50.6	77030.4	110.4	0	
5 JETT SRM	122	21:24:01.9	77041.9	121.9	11.5	
6a POGO - Typ TC-1	232	-	-	-	-	
6b POGO - Typ TC-2	250	-	-	-	-	
7 SI-BO/SII-IGN	259	21:26:19.5	77179.5	259.5	149.1	
8 JETT SHROUD	270	21:26:31.9	77191.9	271.9	161.5	
9 STG II BO	468	21:29:47.6	77387.6	467.6	357.2	
10 JETT STG II	474	21:29:57.0	77397.0	477.0	366.6	
11 MES-I	485	21:30:05.5	77405.5	485.5	375.1	
12 MECO-I	613	21:32:11.3	77531.3	611.3	500.9	
13 MES-II	1824	21:47:31.2	78451.2	1531.2	1420.8	
14 MECO-II	2140	21:52:46.3	78766.3	1846.3	1735.9	
15 S/C SEP.	2360	21:56:30	78990	2070	1959.6	

*21:22:00 is instant of igniting : actual measured first motion occurred at 21:22:00.632

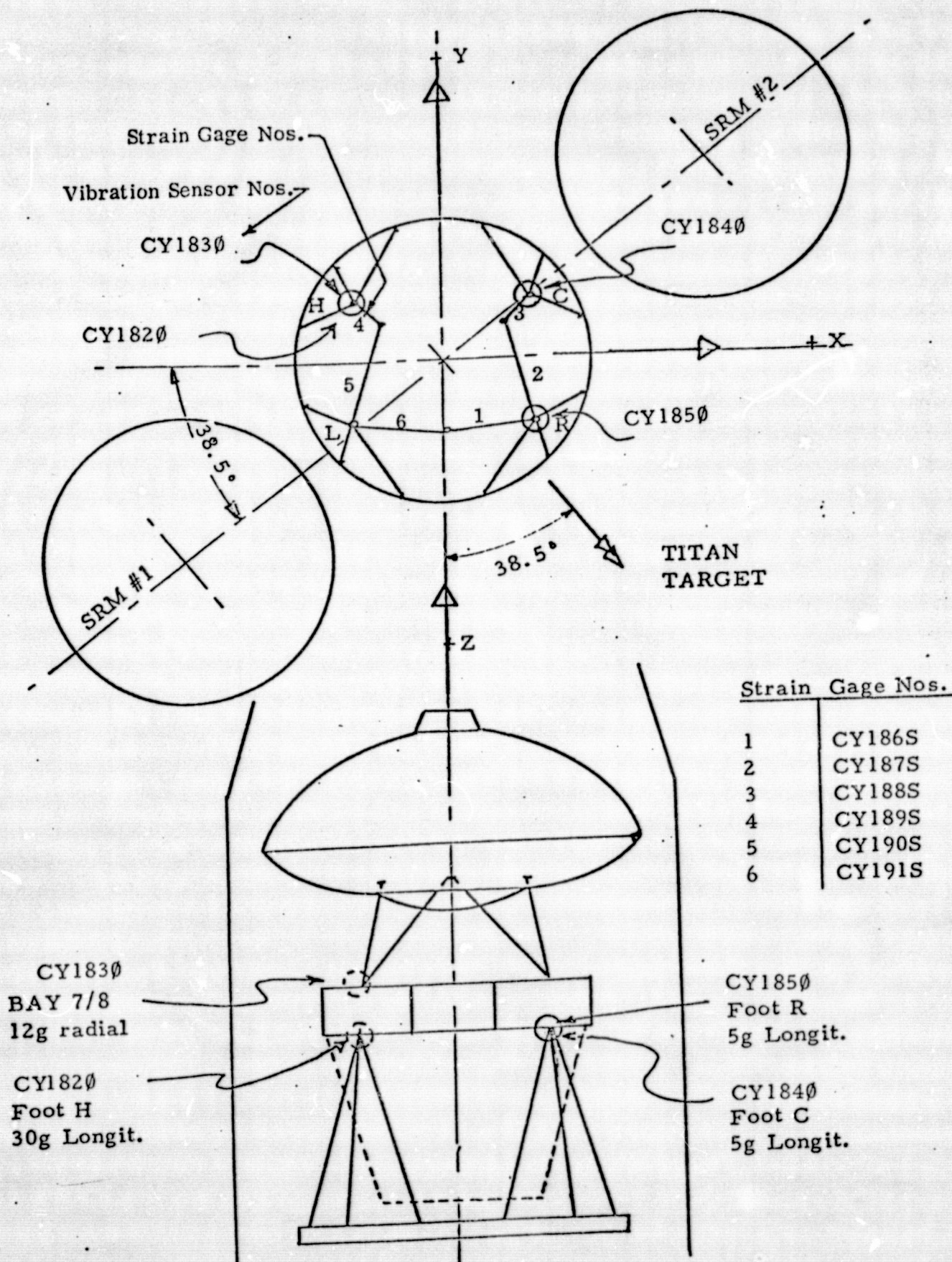
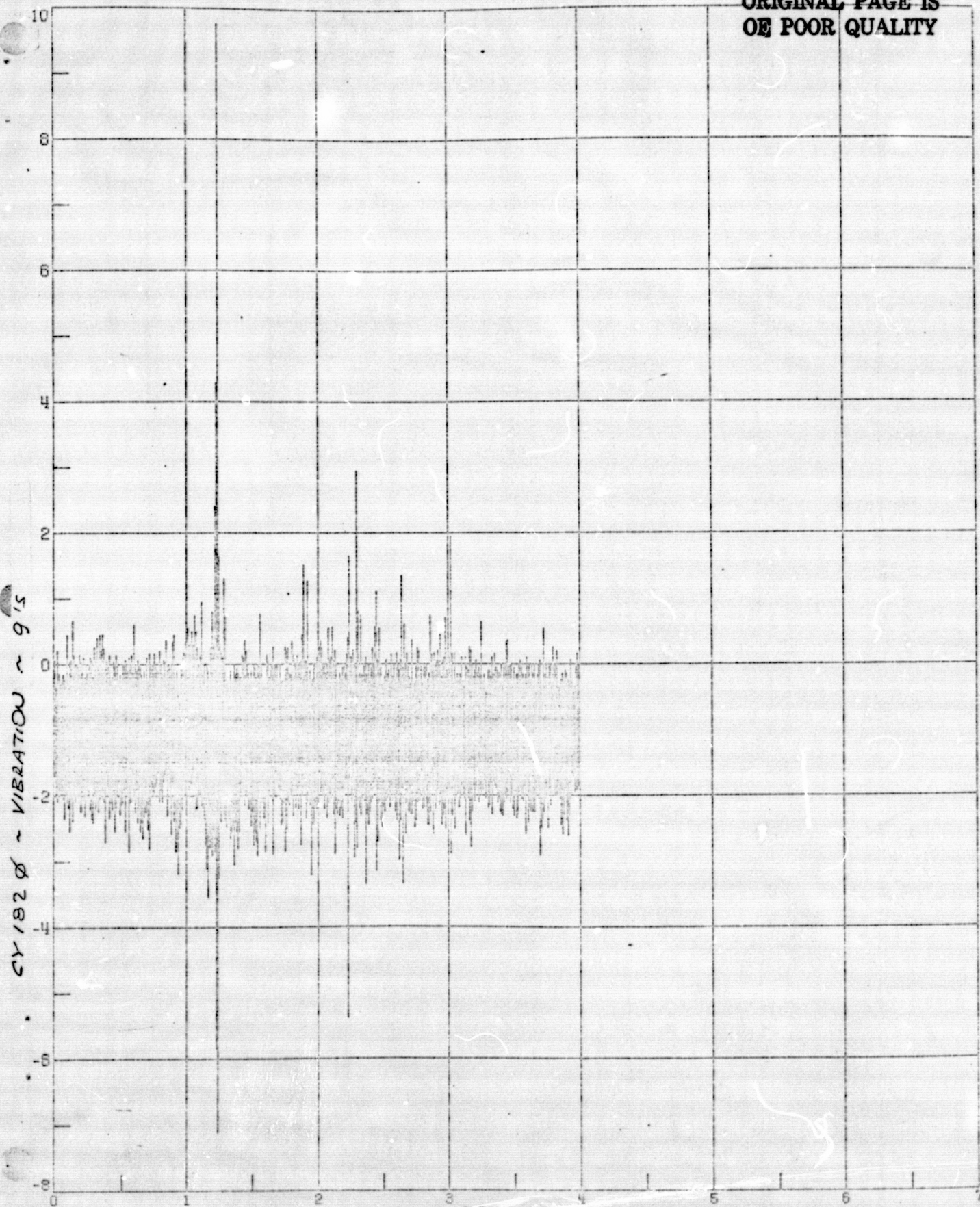


FIGURE 3.1 VIKING SPACECRAFT INSTRUMENT LOCATIONS

ORIGINAL PAGE IS
OF POOR QUALITY



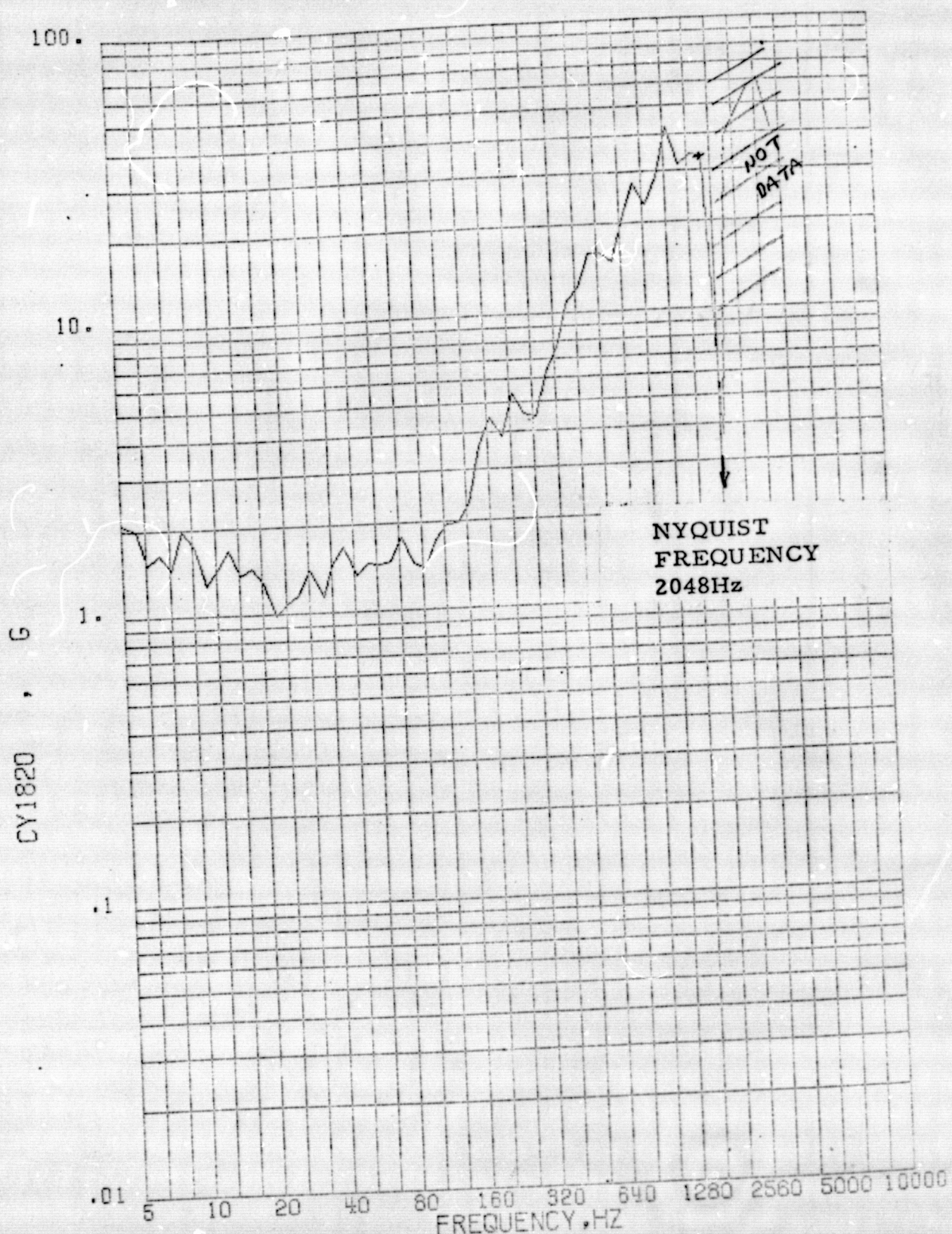
START=76919.5000SEC.

STOP=76923.5000SEC.

Figure 3.6a

Figure 3.2a

SHOCK SPECTRUM

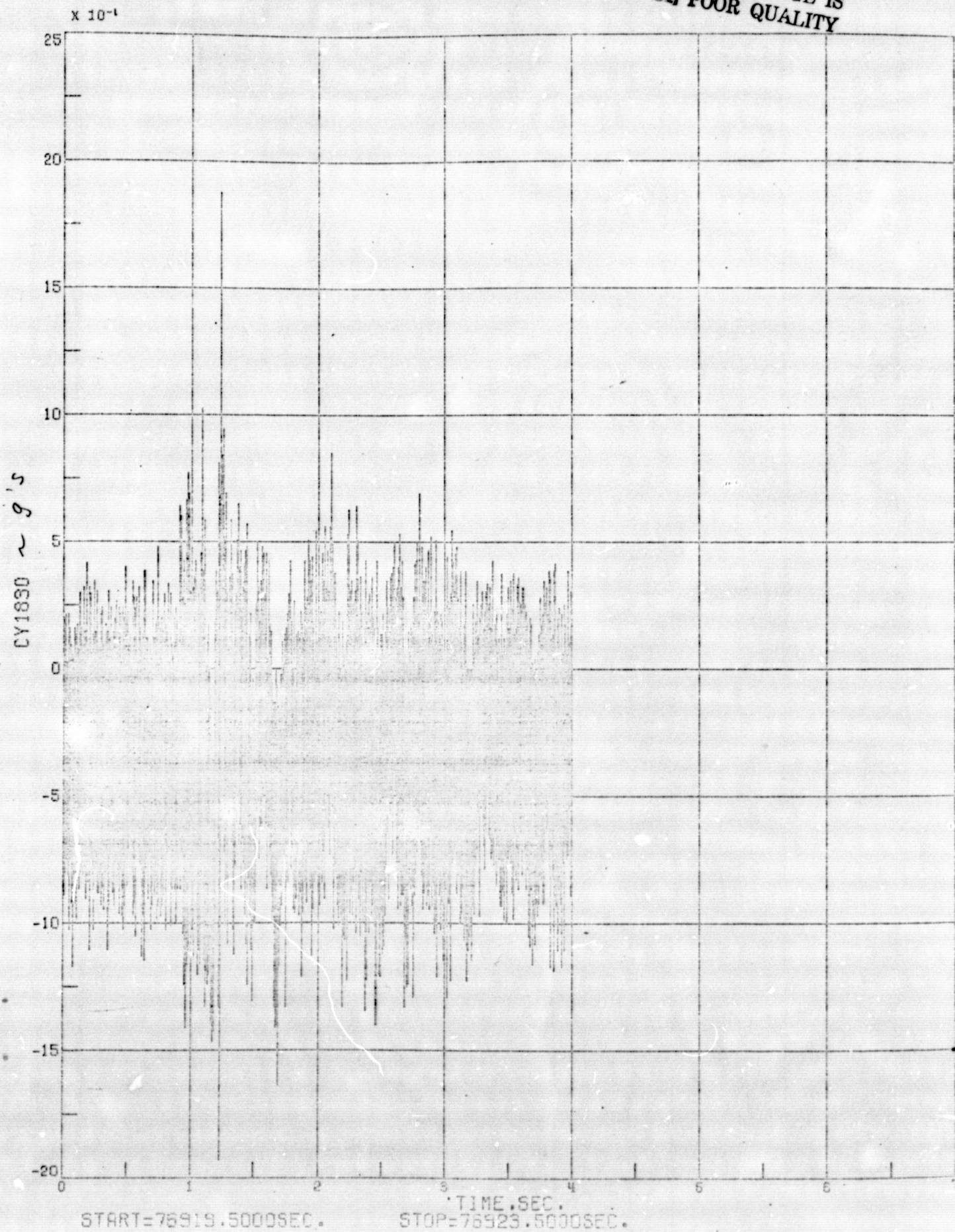


START=76920.1000SEC. STOP=76923.5000SEC. Q=10.
 VIKING A ST G 0 16N 8/ CY1820

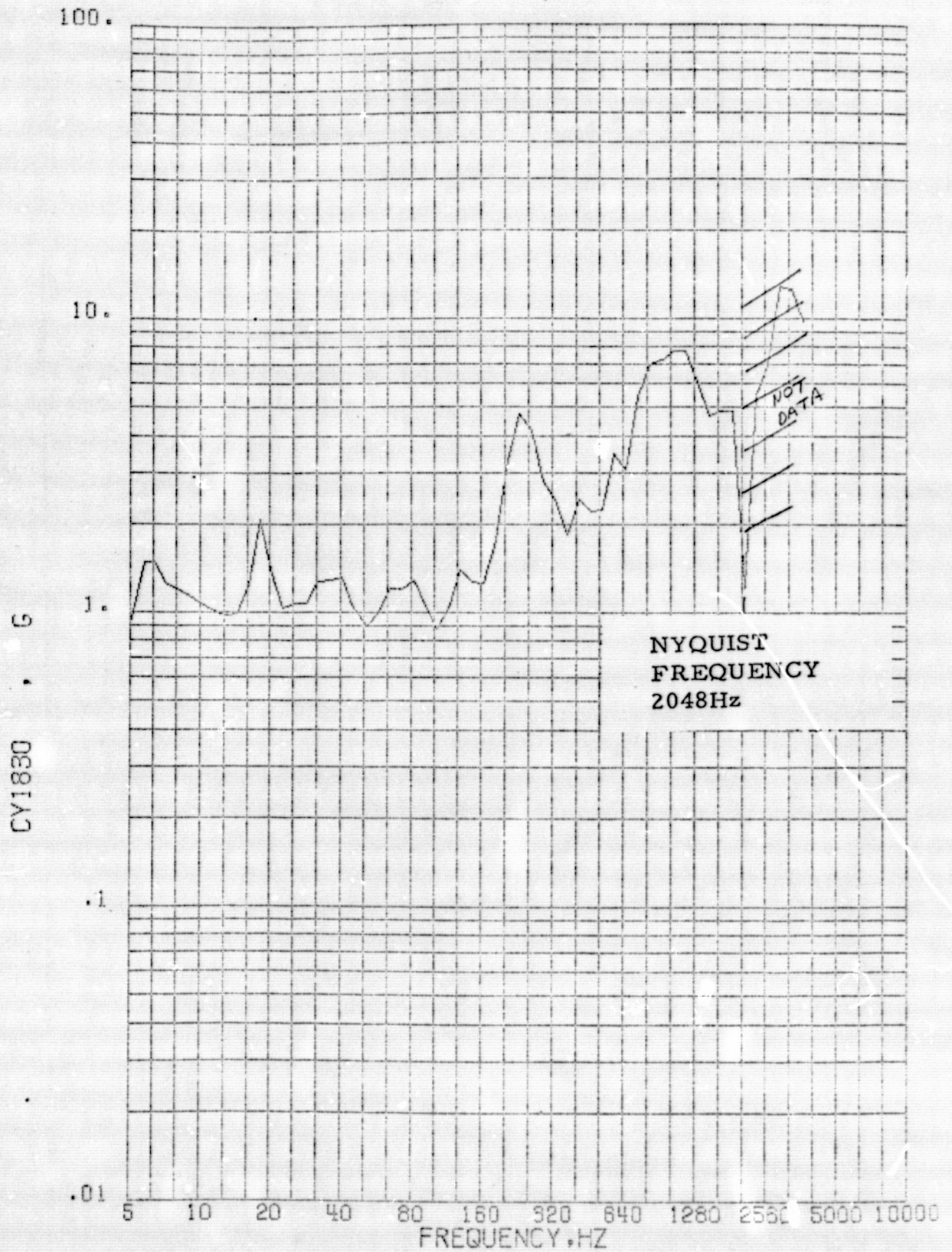
Figure 3.7 3.2b

Figure 3.2b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76923.5000SEC.

Q=10.

VIKING A

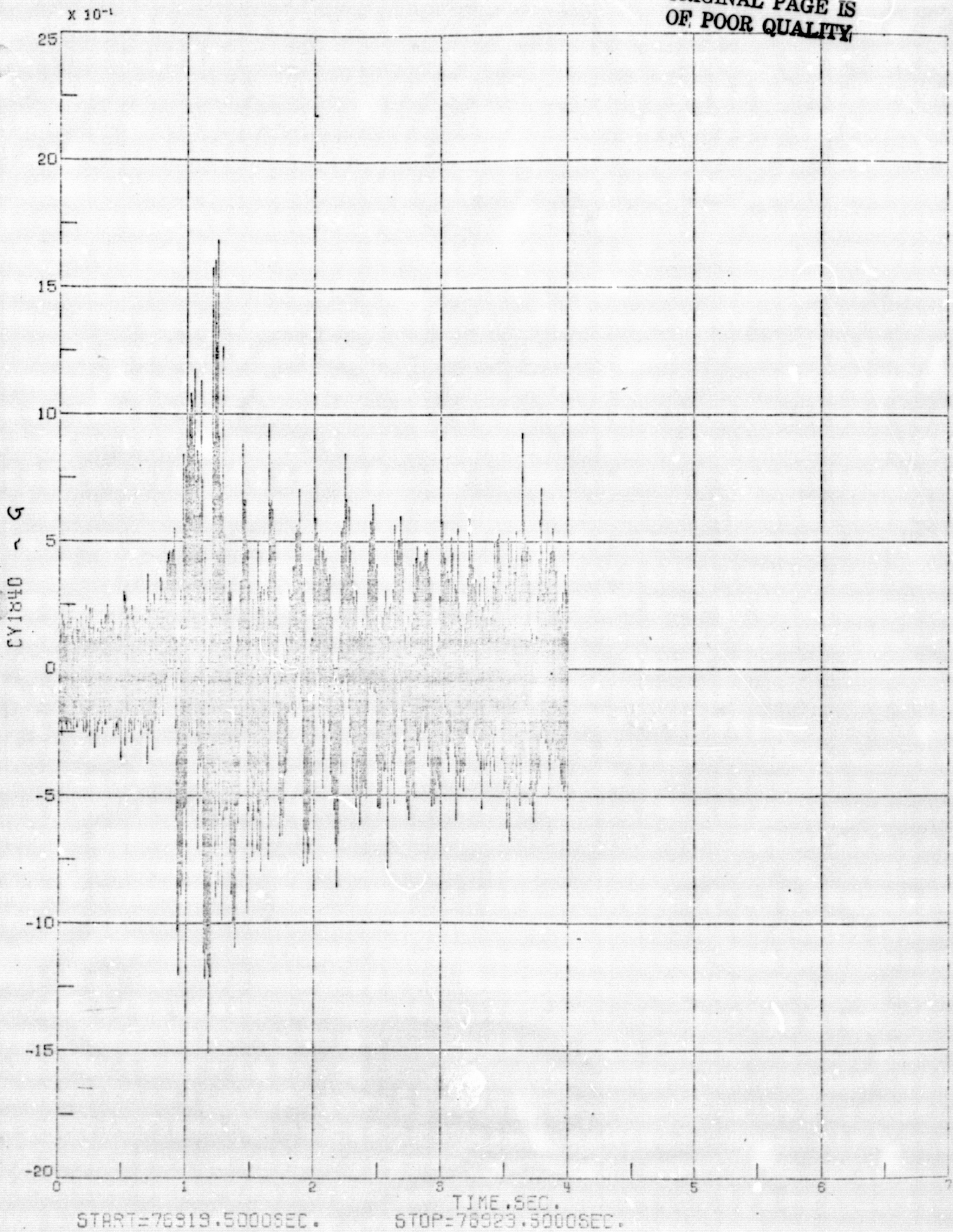
ST G 0 IGN.

8/ CY1830

3.9
3.3 b

Figure 3.3b

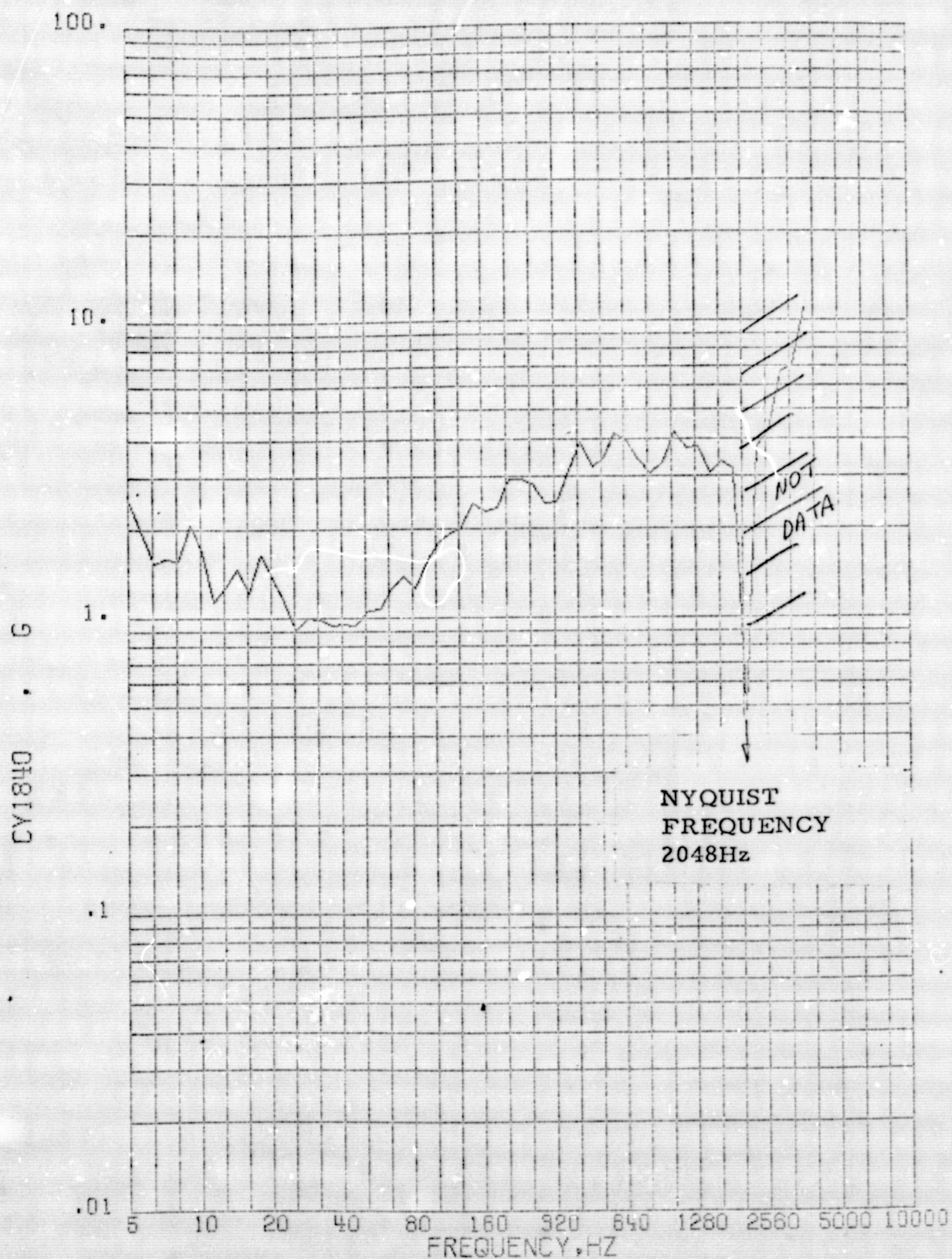
ORIGINAL PAGE IS
OF POOR QUALITY



3.109

Figure 3.4a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76923.5000SEC.

Q=10.

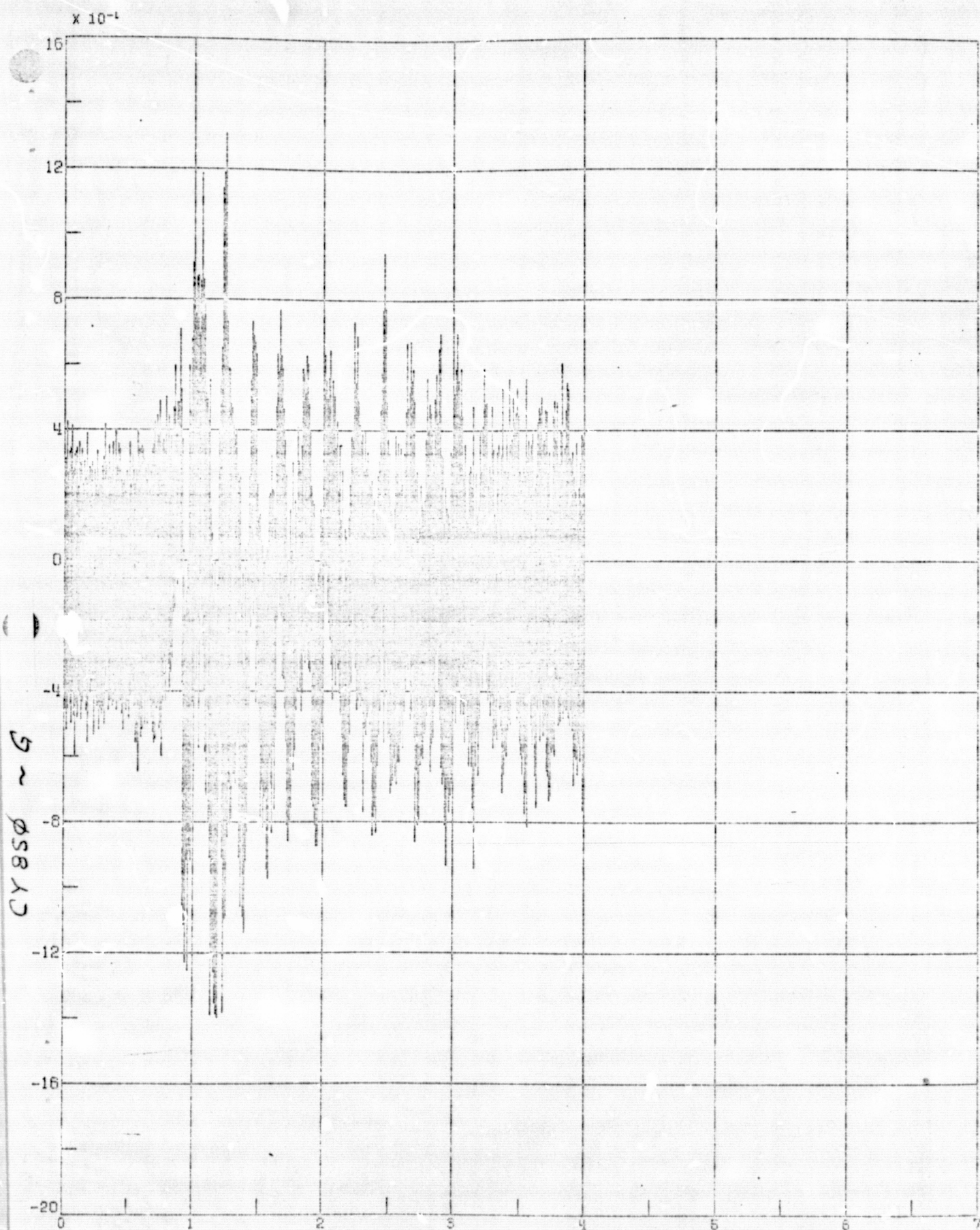
VIKING A

ST G C IGN

8/ CY1640

3.11
340

Figure 3.4b



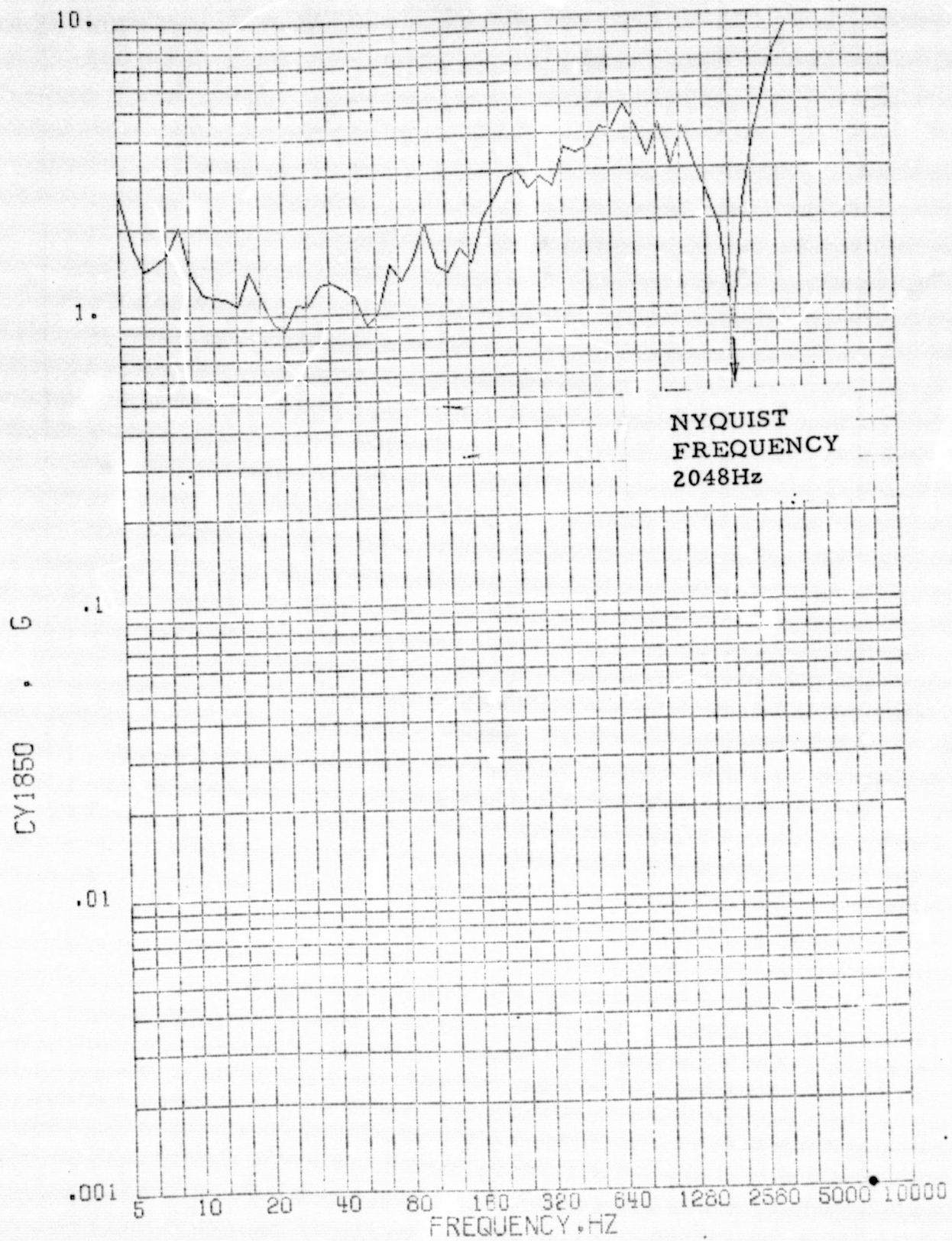
START=76919.5000SEC.

STOP=76925.5000SEC.

3.12

Figure 3.5a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76923.5000SEC.

Q=10.

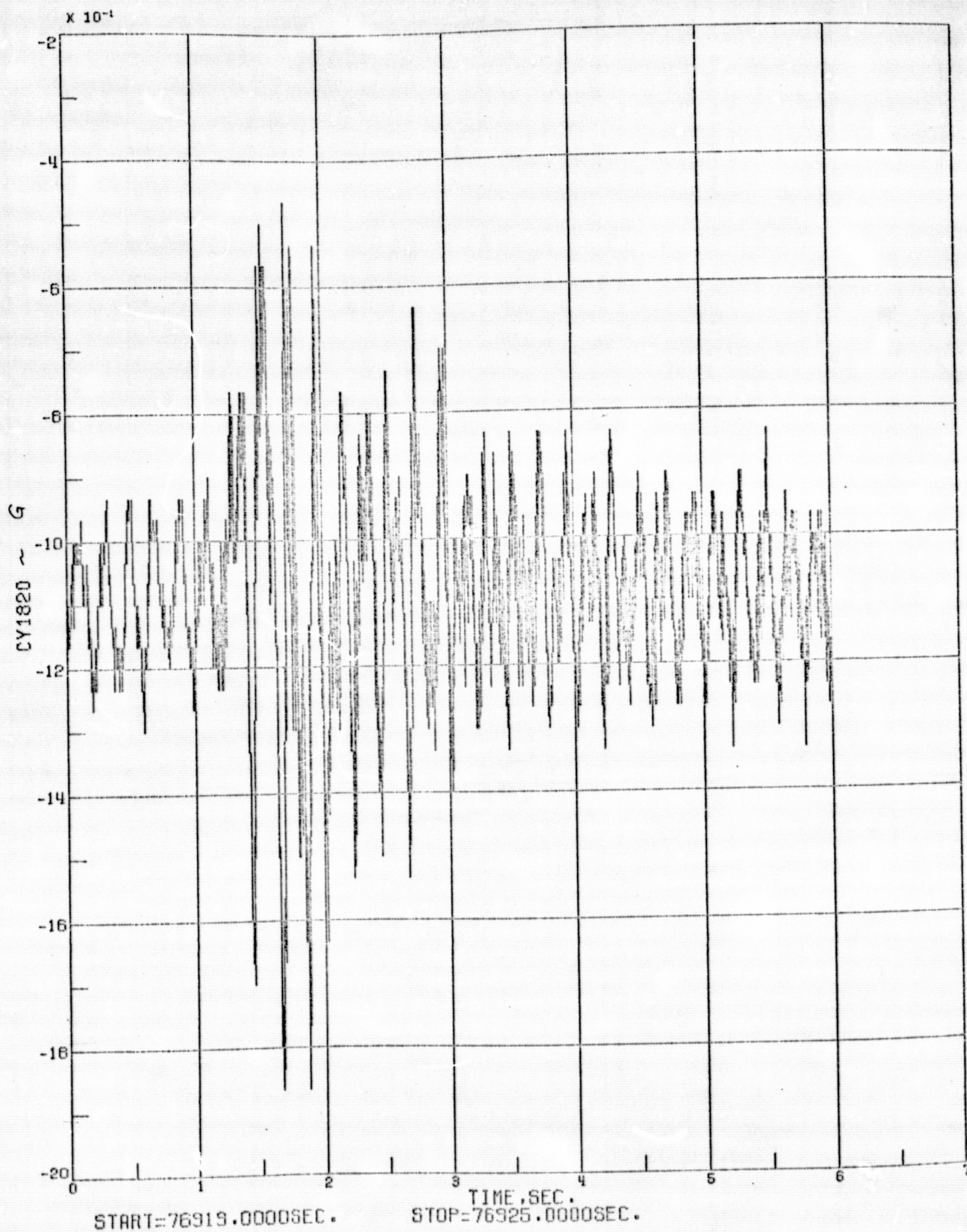
VIKING A

ST G O IGN

8/ CY1850

3,13,5b

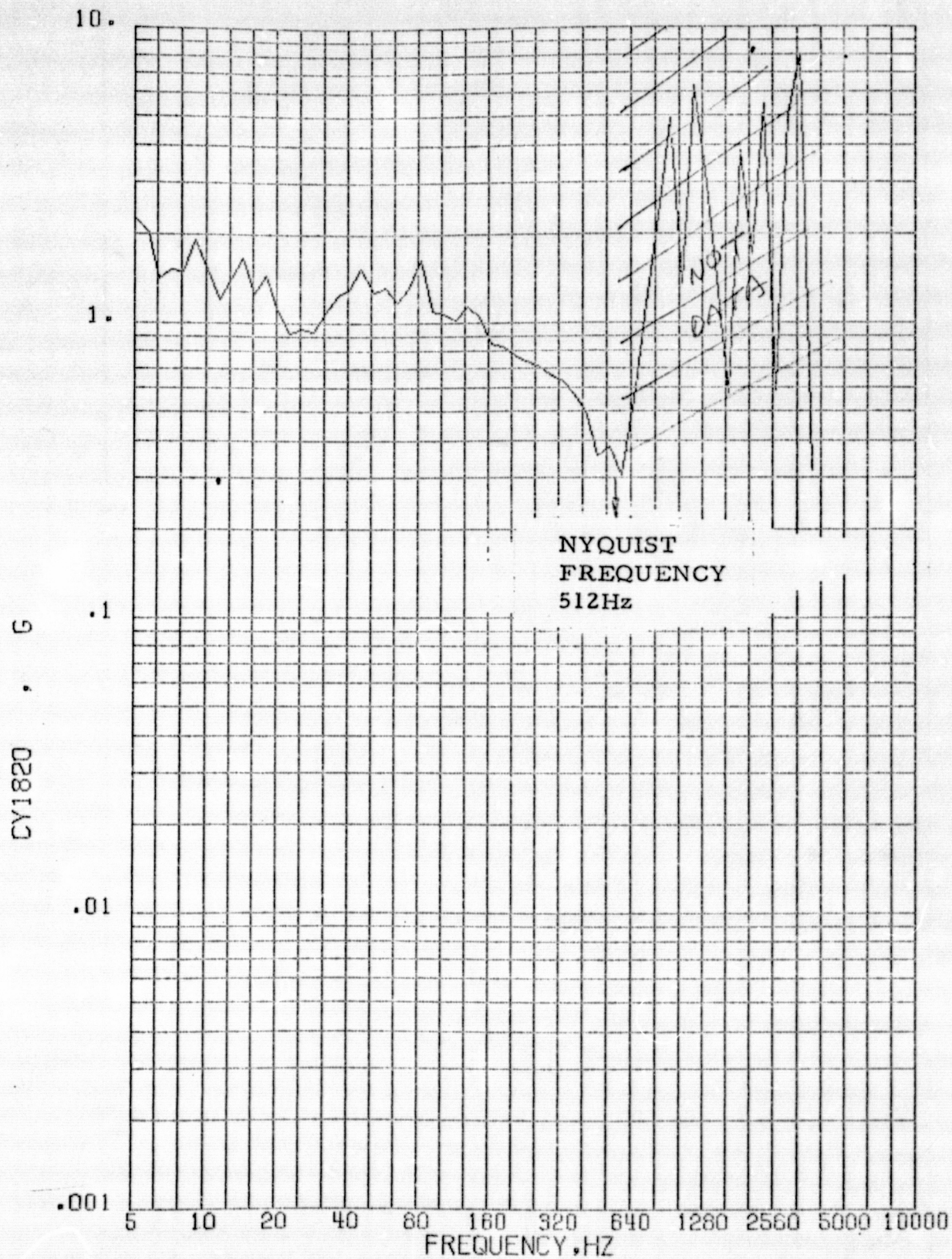
Figure 3.5b



3.63.14

Figure 3.6a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

0=10.

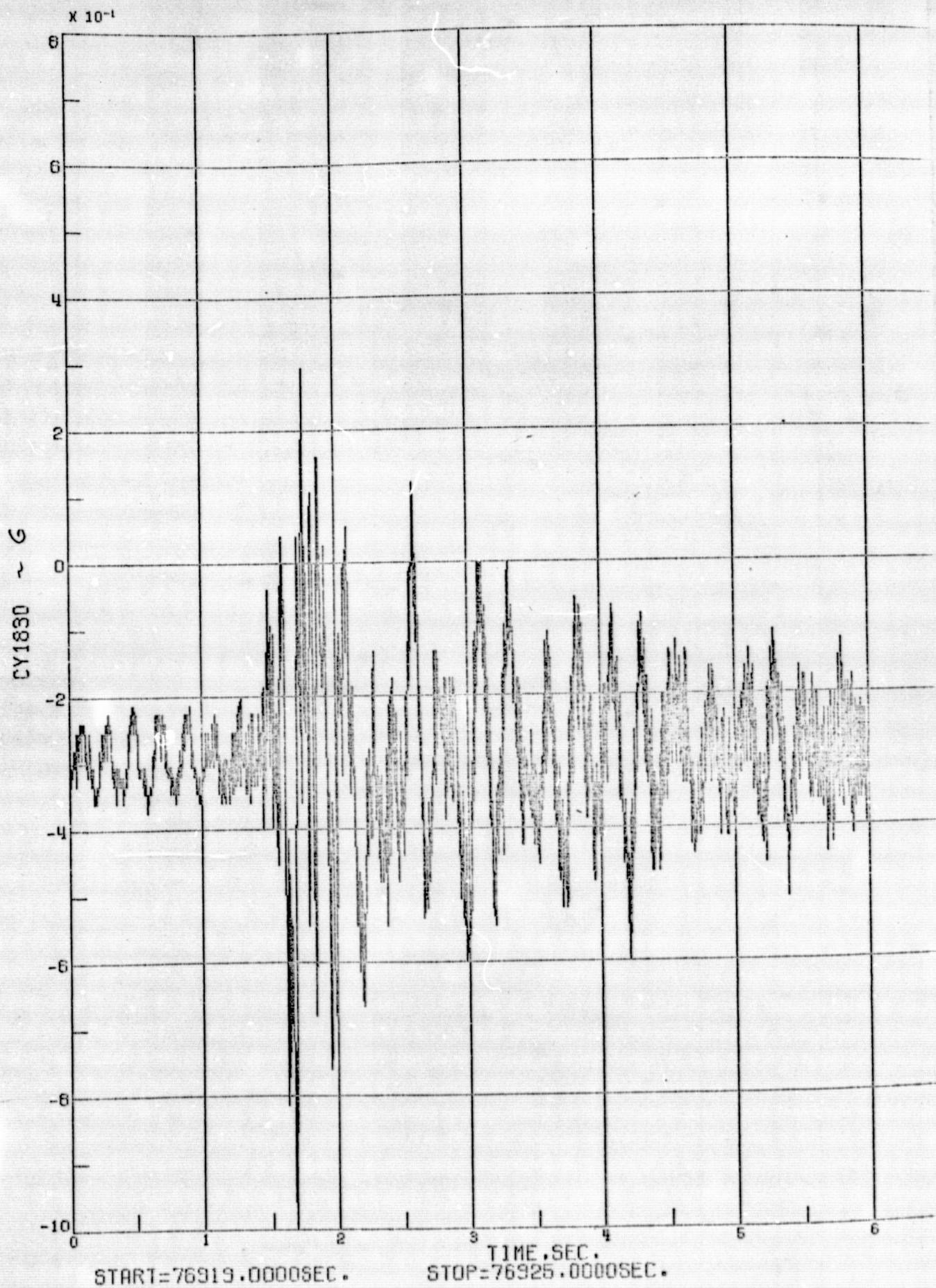
VIKING A

ST 5 0 IGN

8/ CY1820

3.15
3.66

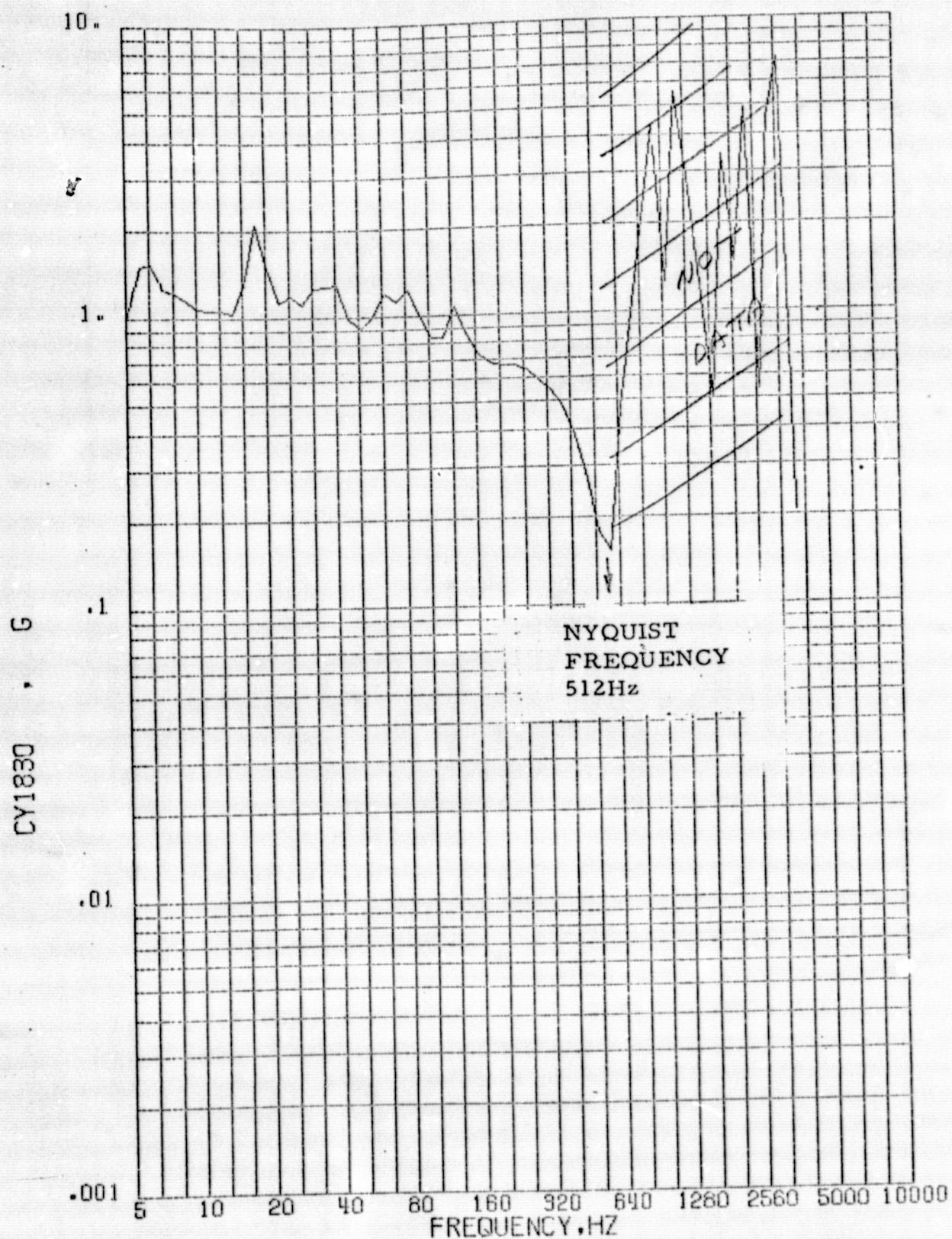
Figure 3.6b



3.16, 9

Figure 3.7a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

Q=10.

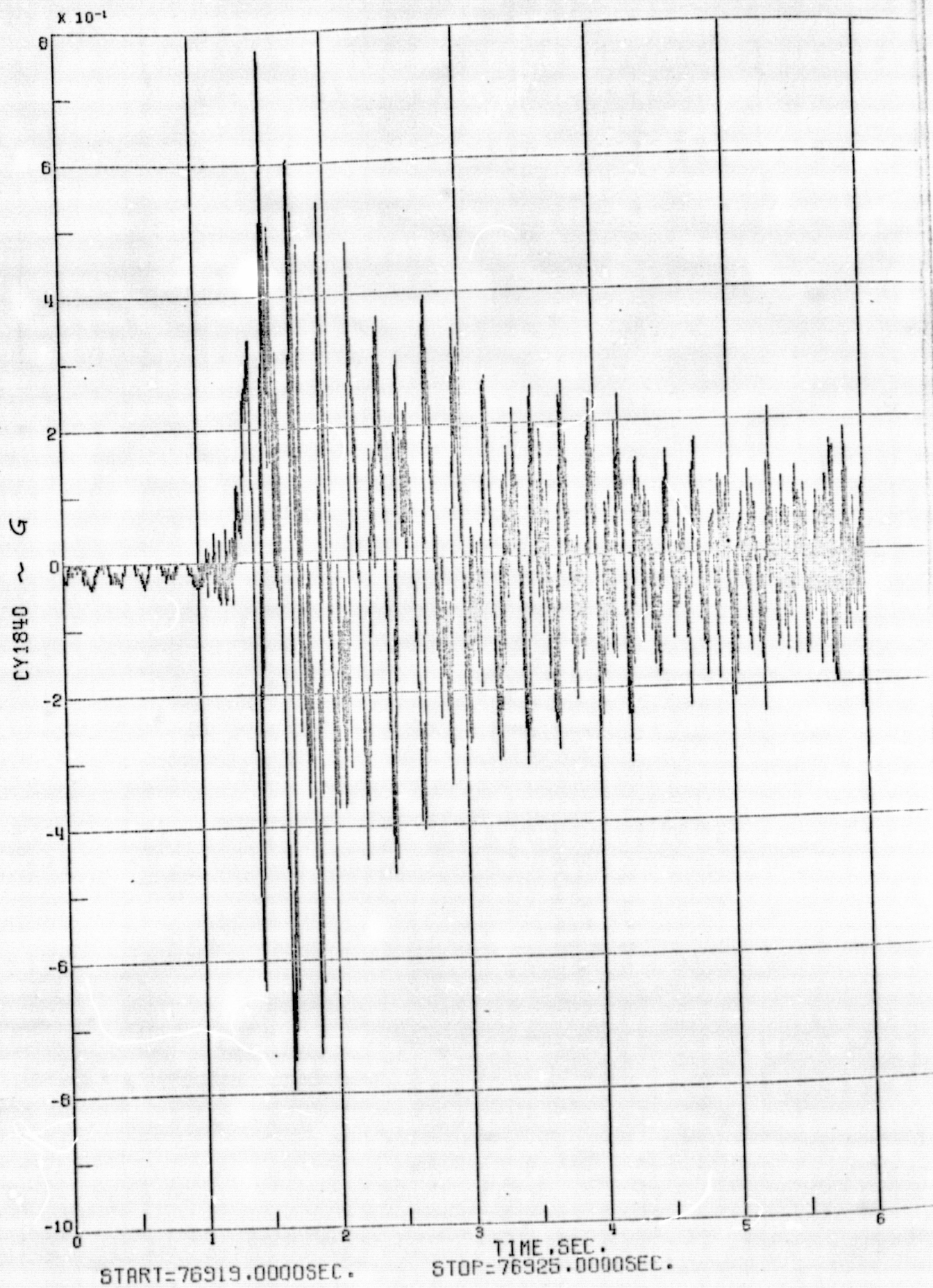
VIKING A

ST G 0 IGN

8/ CY1830

3.17
3.7 b

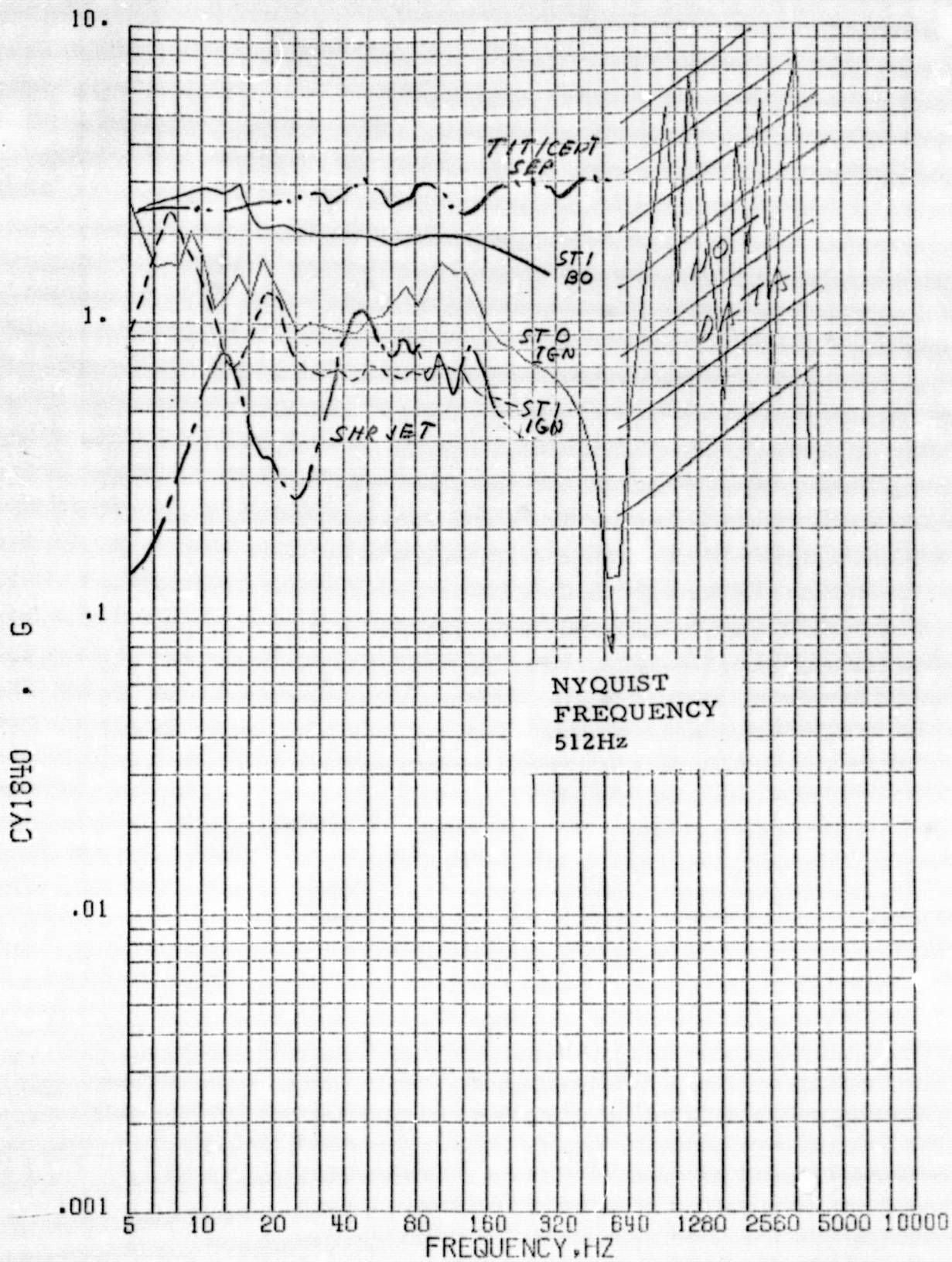
Figure 3.7b



3.18
3.09

Figure 3.8a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

Q=10.

VIKING A

ST G O 1GN.

8/ CY1840

3.19

2.86

Figure 3.8b

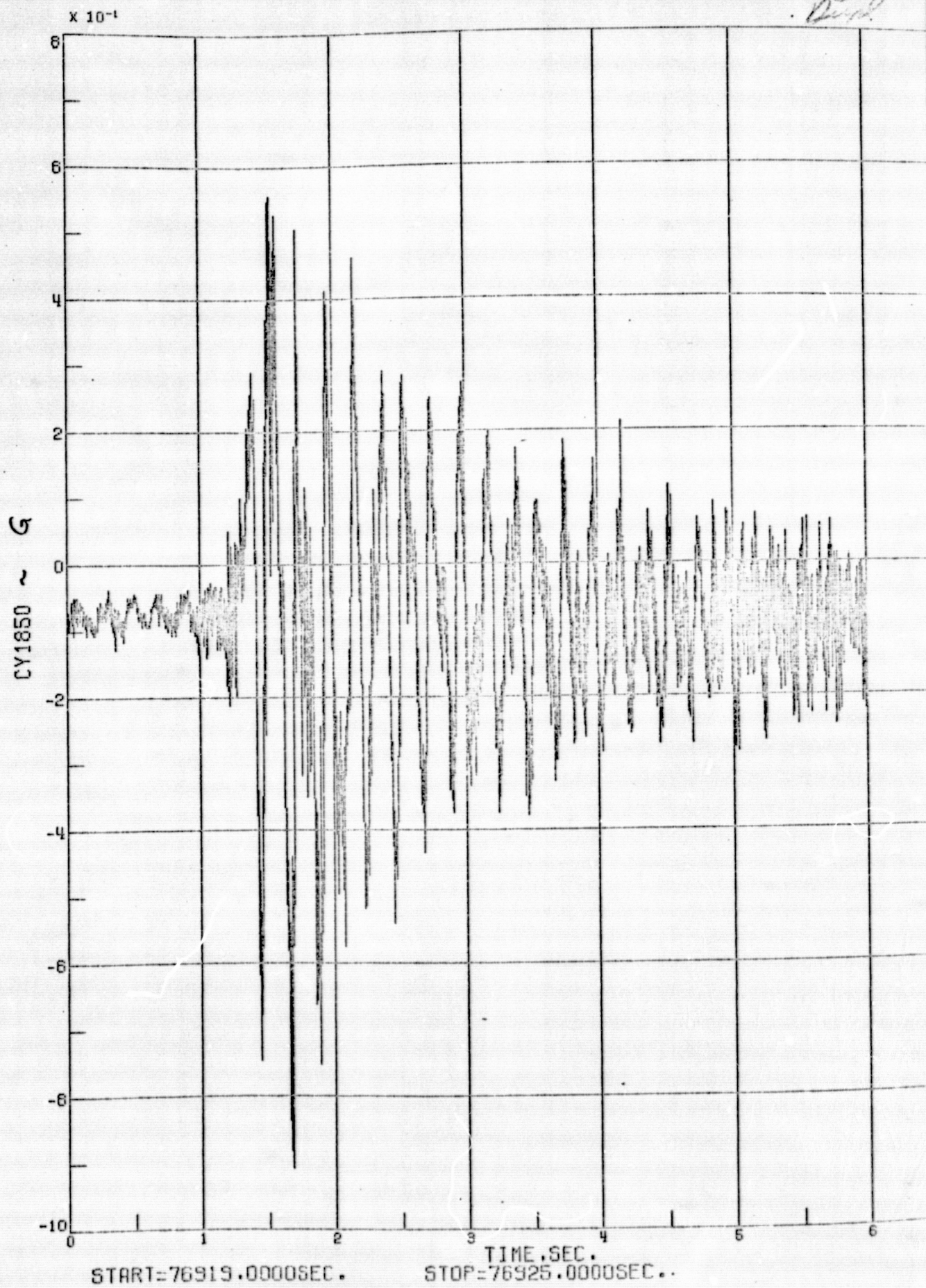
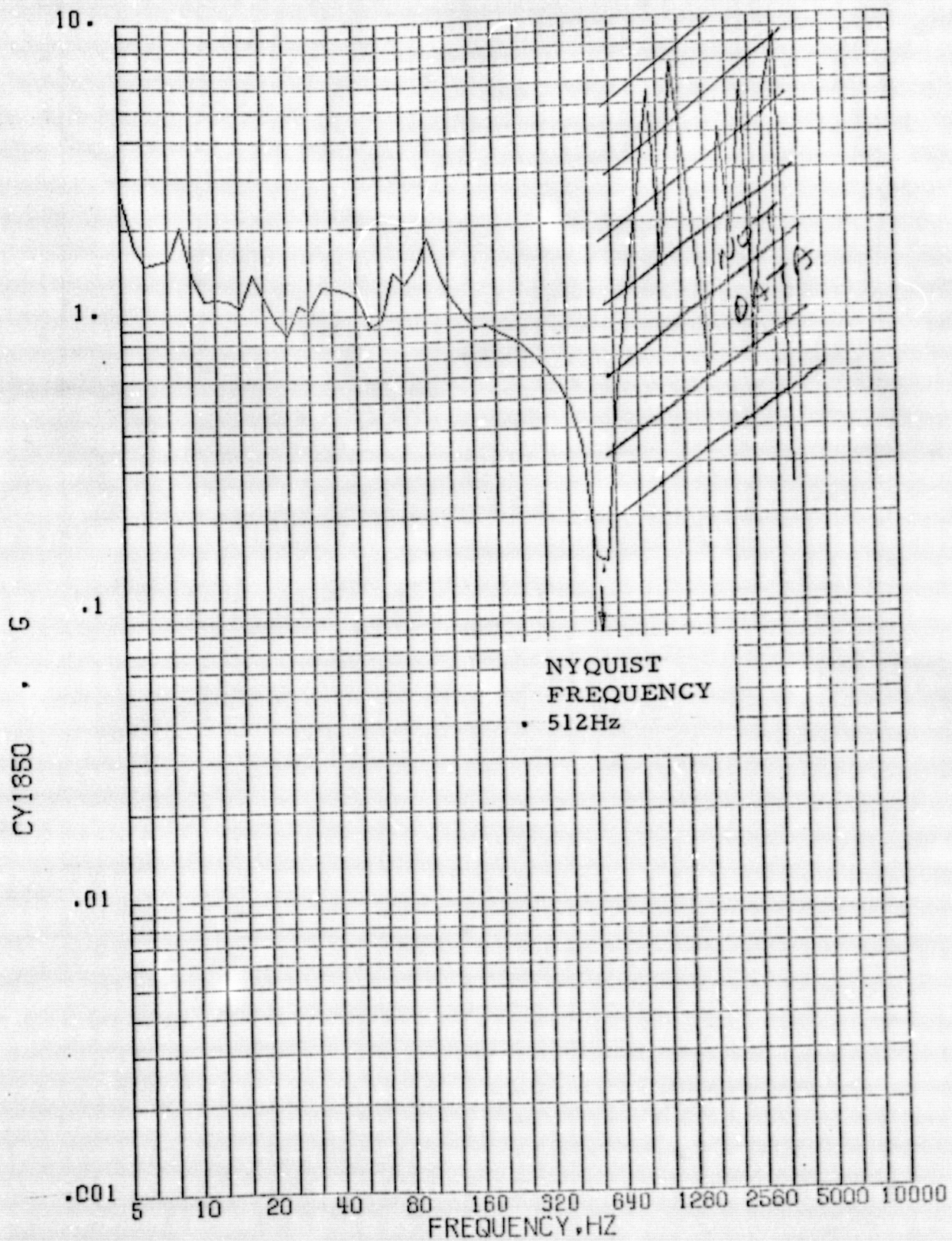


Figure 3.9a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

Q=10.

VIKING A

ST G 0 IGN

8/ CY1850

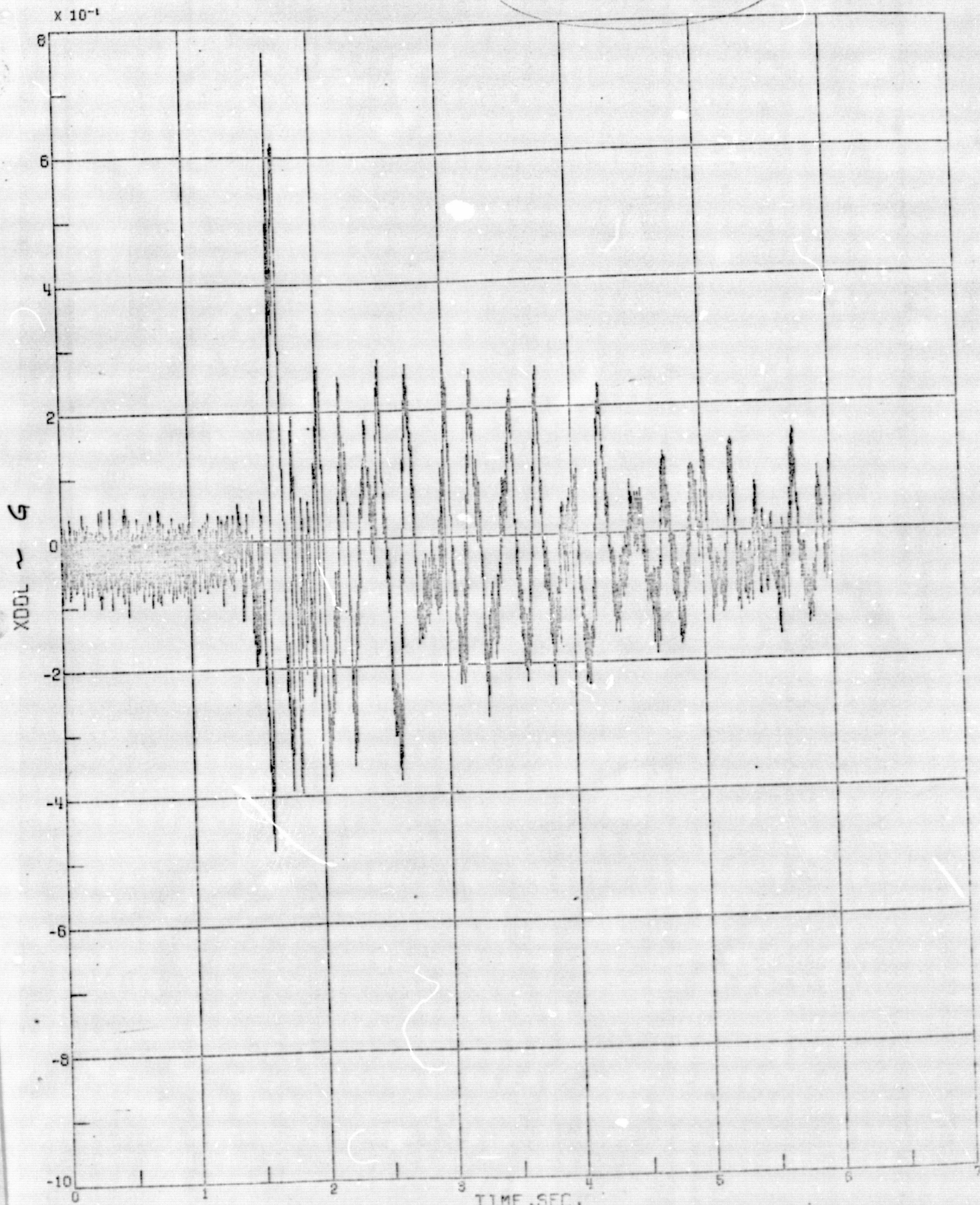
3.9 3.21

Figure 3.9b

Z = long.
X & Y lateral

VLC CG.
DATA.

3



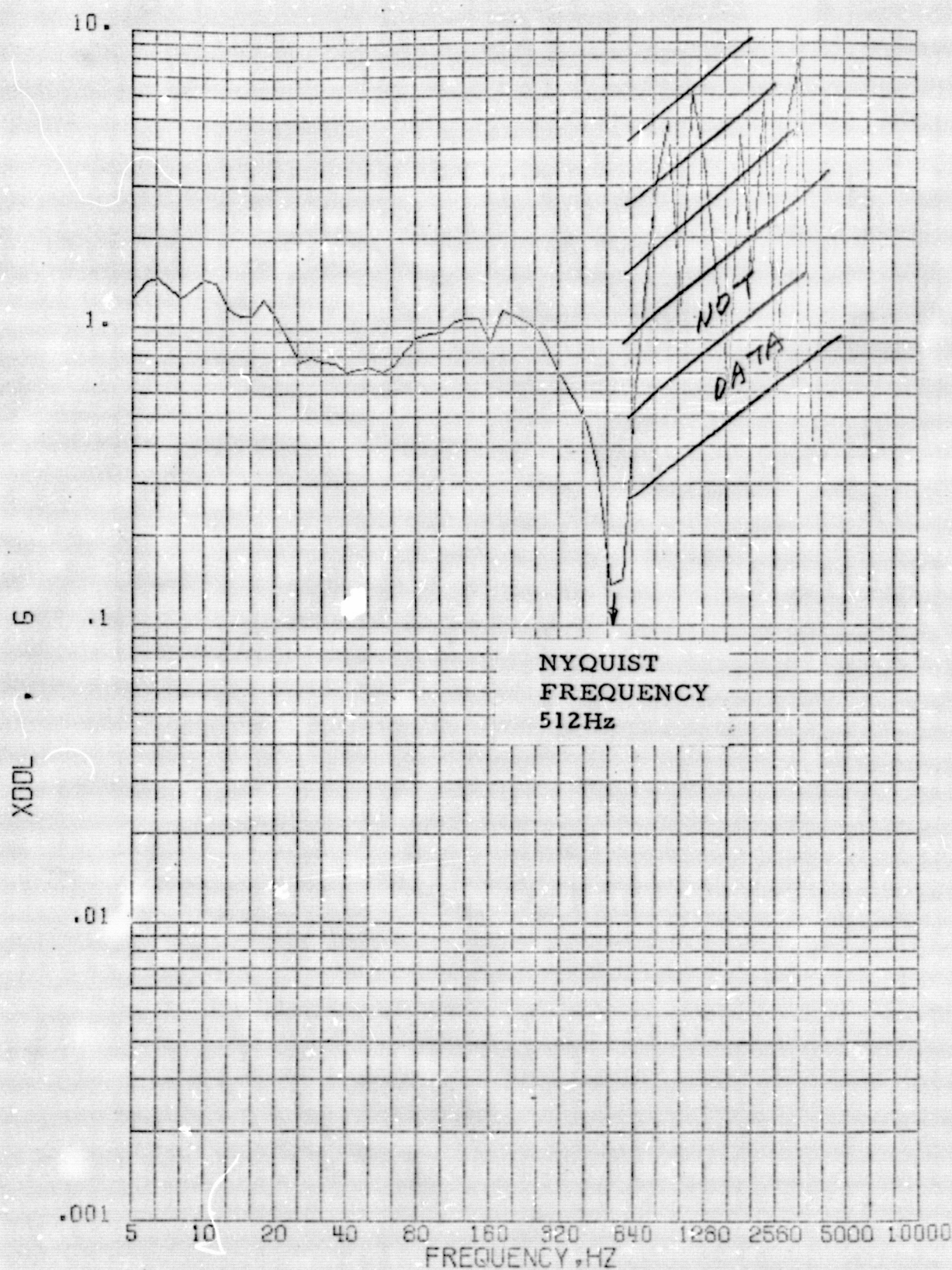
START=76919.0000SEC.

STOP=76926.0000SEC.

3103.22

Figure 3.10a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

Q=10.

VIKING A

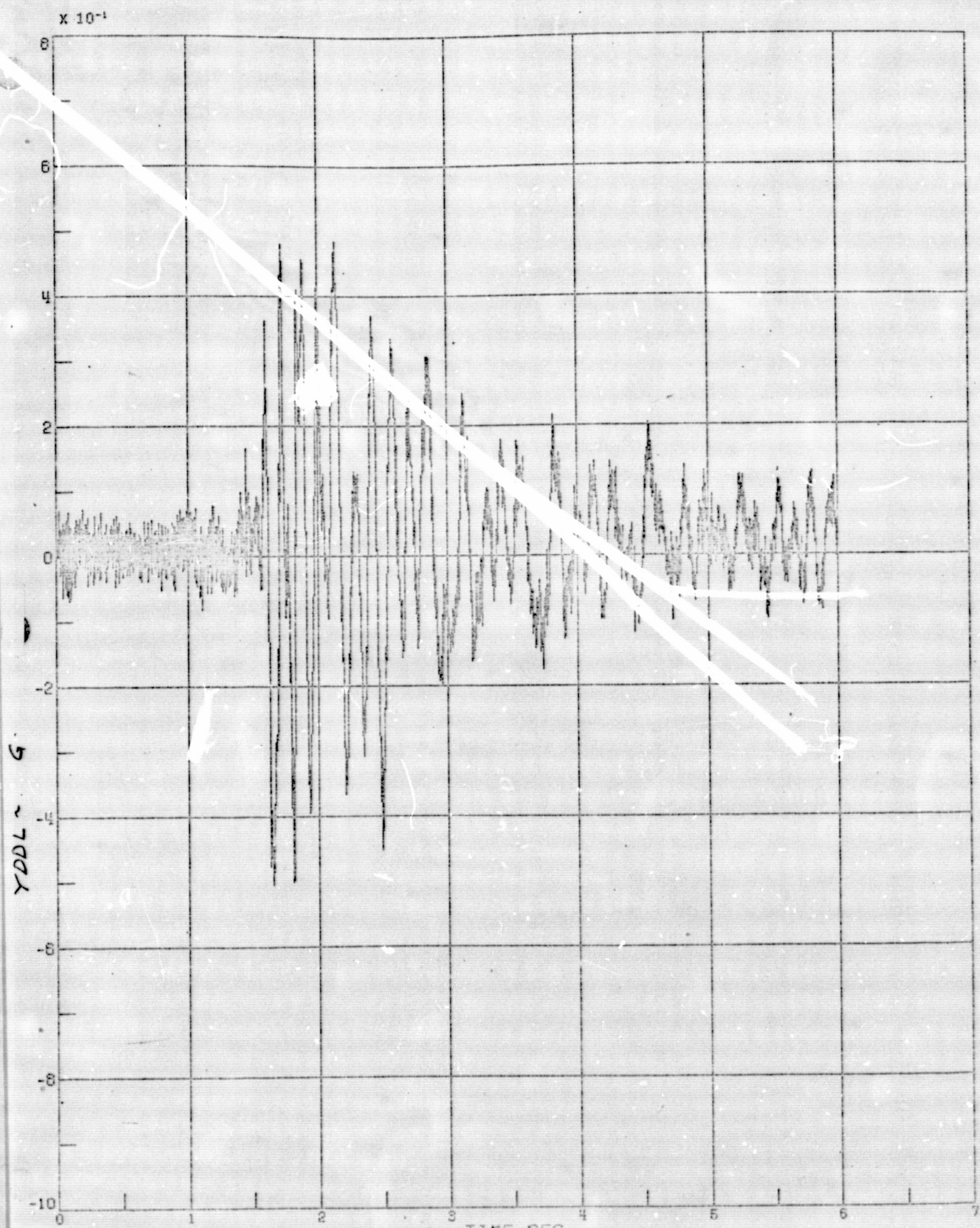
ST G O IGN

8/

XDDL

3.23_b

Figure 3.10b



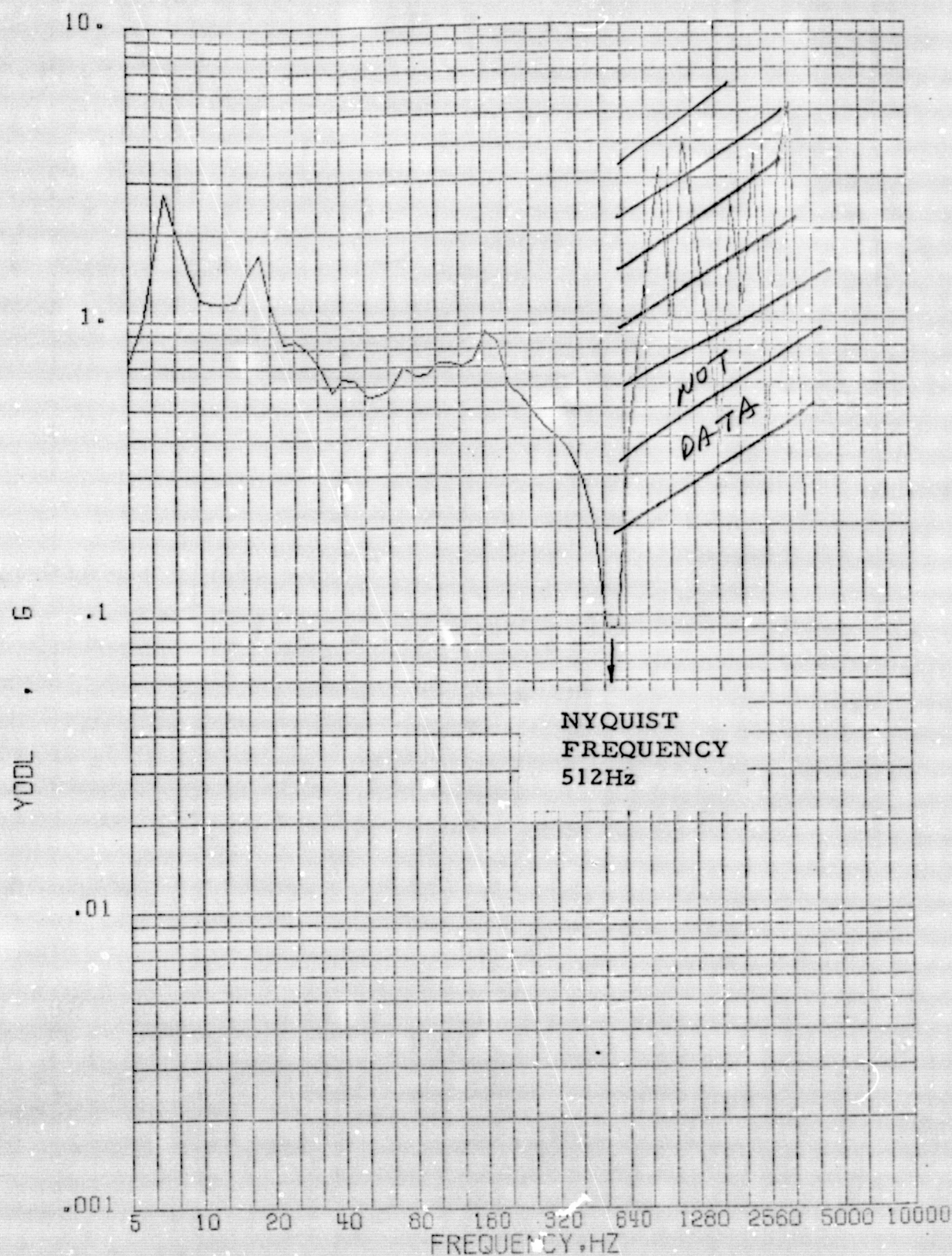
START=76919.0000SEC.

STOP=76925.0000SEC.

23.24

Figure 3.11a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

Q=10.

VIKING A

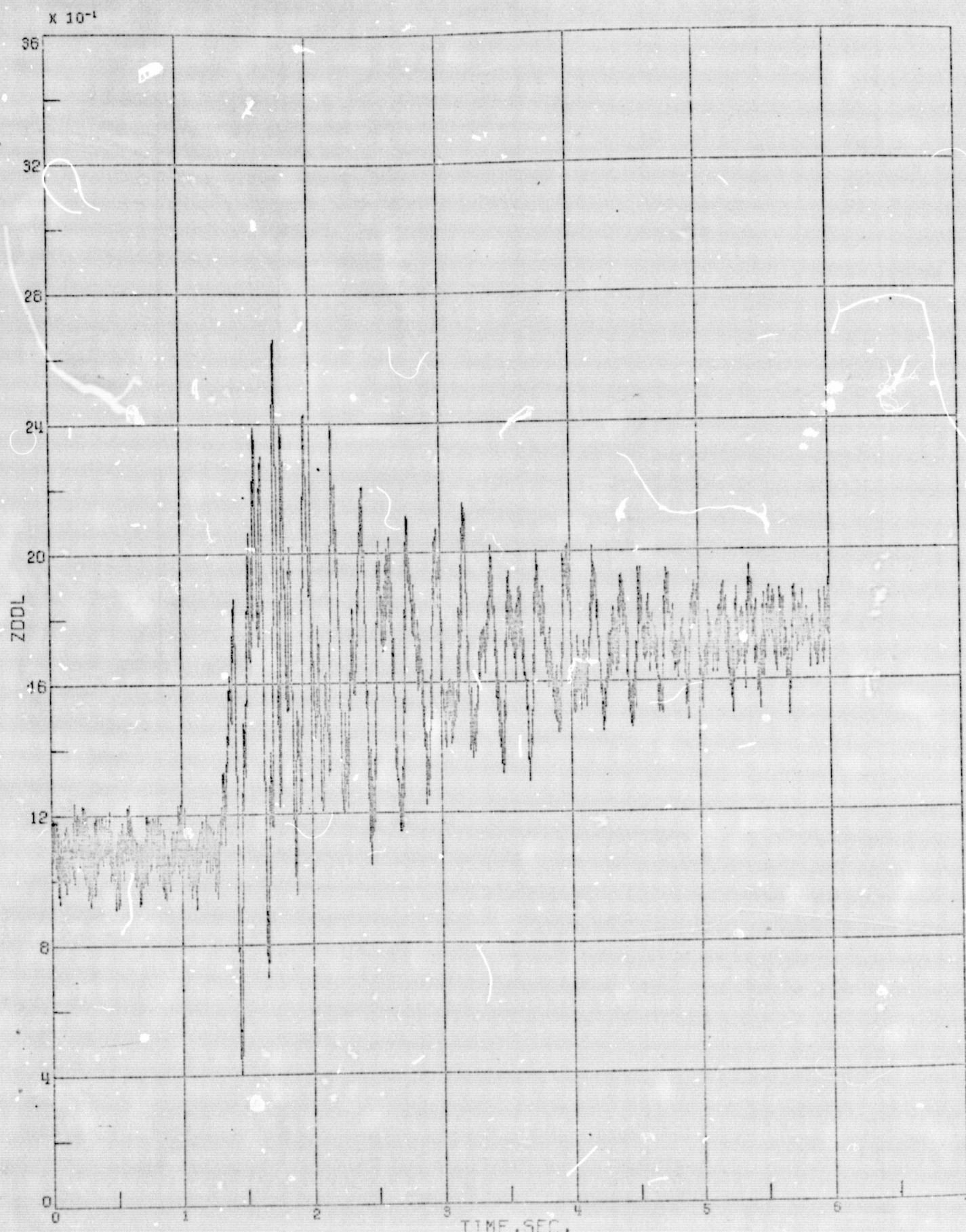
ST G O 1GN

8/ YDDL

3.2511 b

Figure 3.11b

LAT



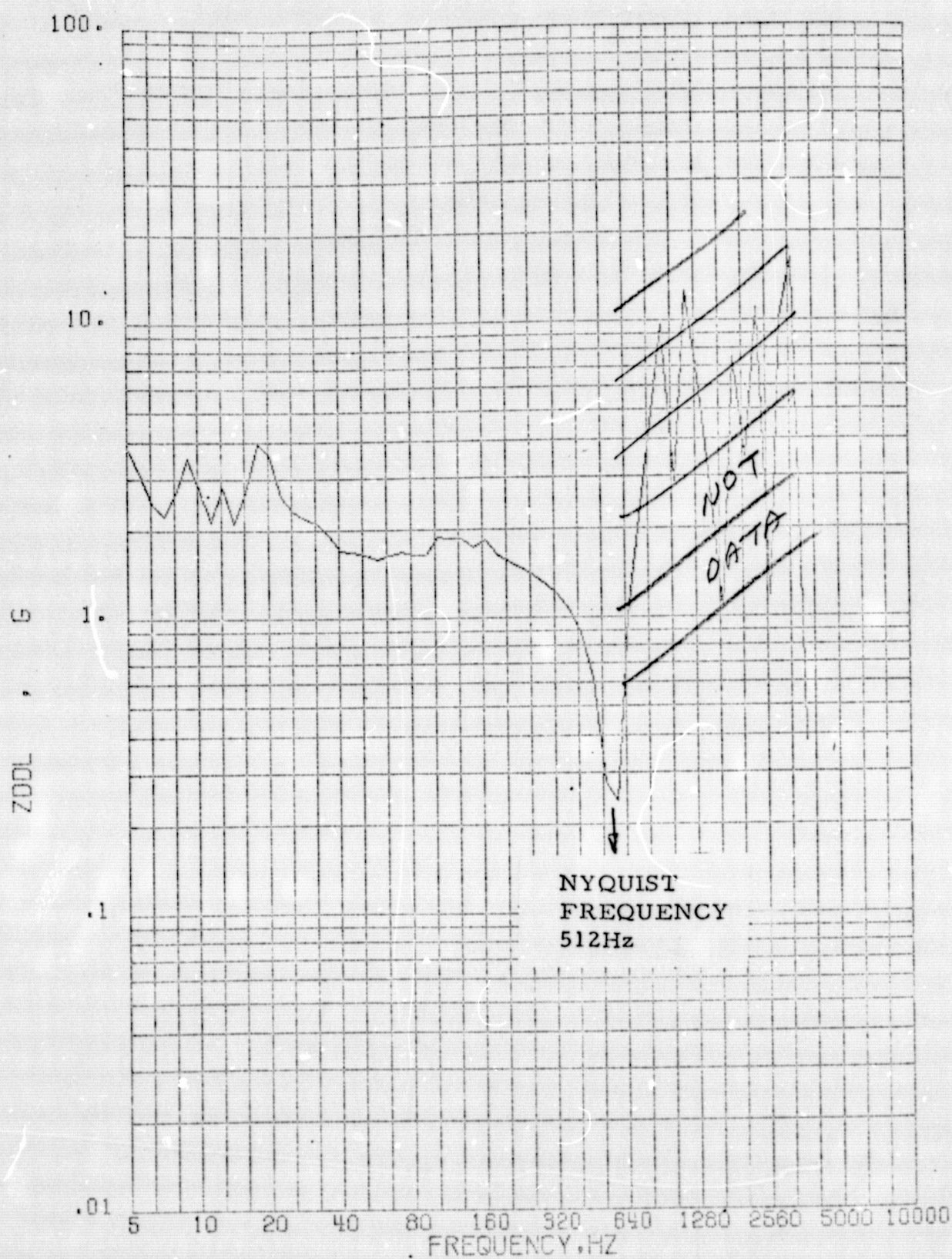
START=76919.0000SEC.

STOP=76925.0000SEC.

3.26 9

Figure 3.12a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

Q=10.

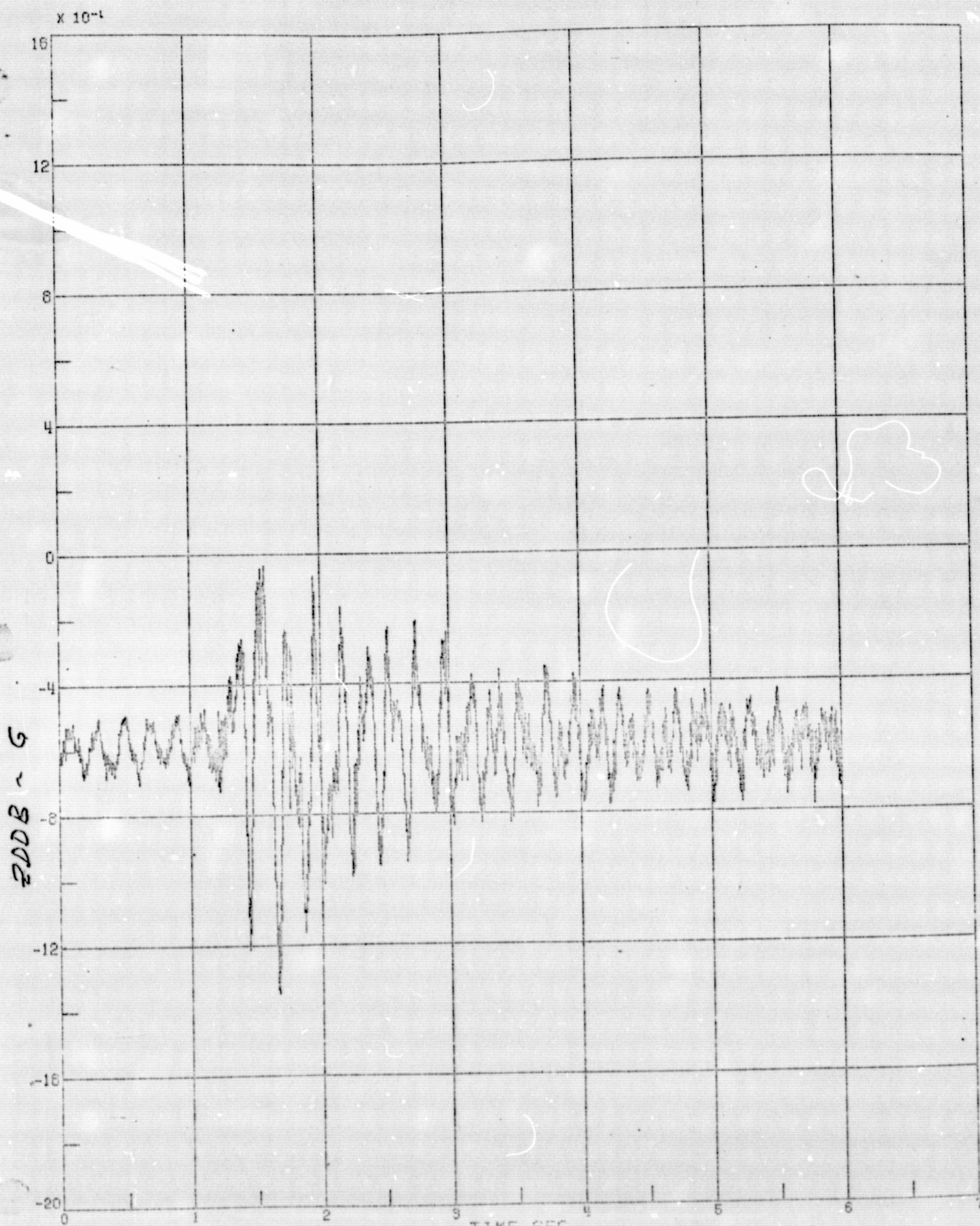
VIKING A

ST G 0 IGN.

8/ Z00L

3.327

Figure 3.12b



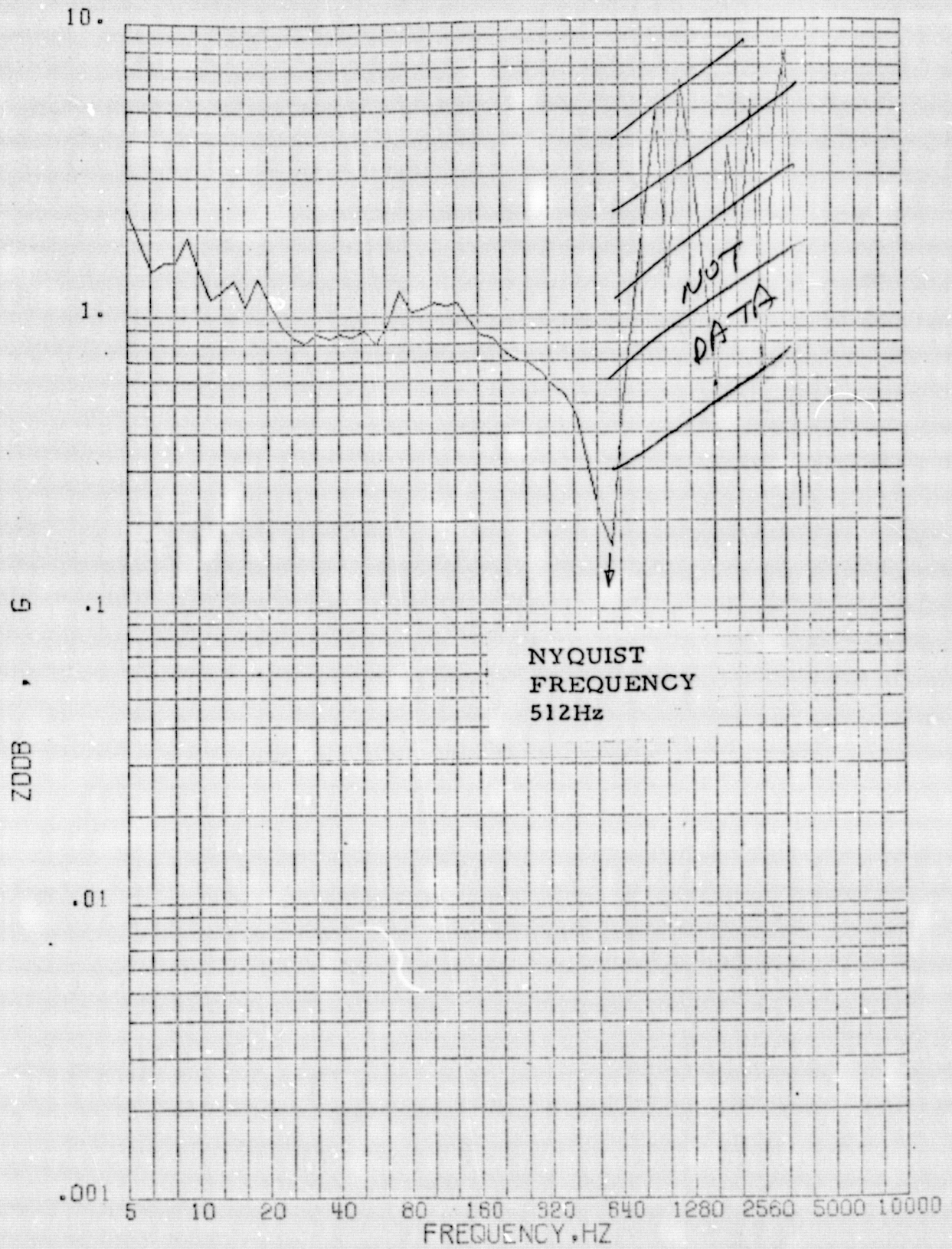
START=76919.0000SEC.

STOP=76925.0000SEC.

3328

Figure 3.12a

SHOCK SPECTRUM



START=76920.1000SEC.

STOP=76925.0000SEC.

Q=10.

VIKING R

ST G 0 IGN.

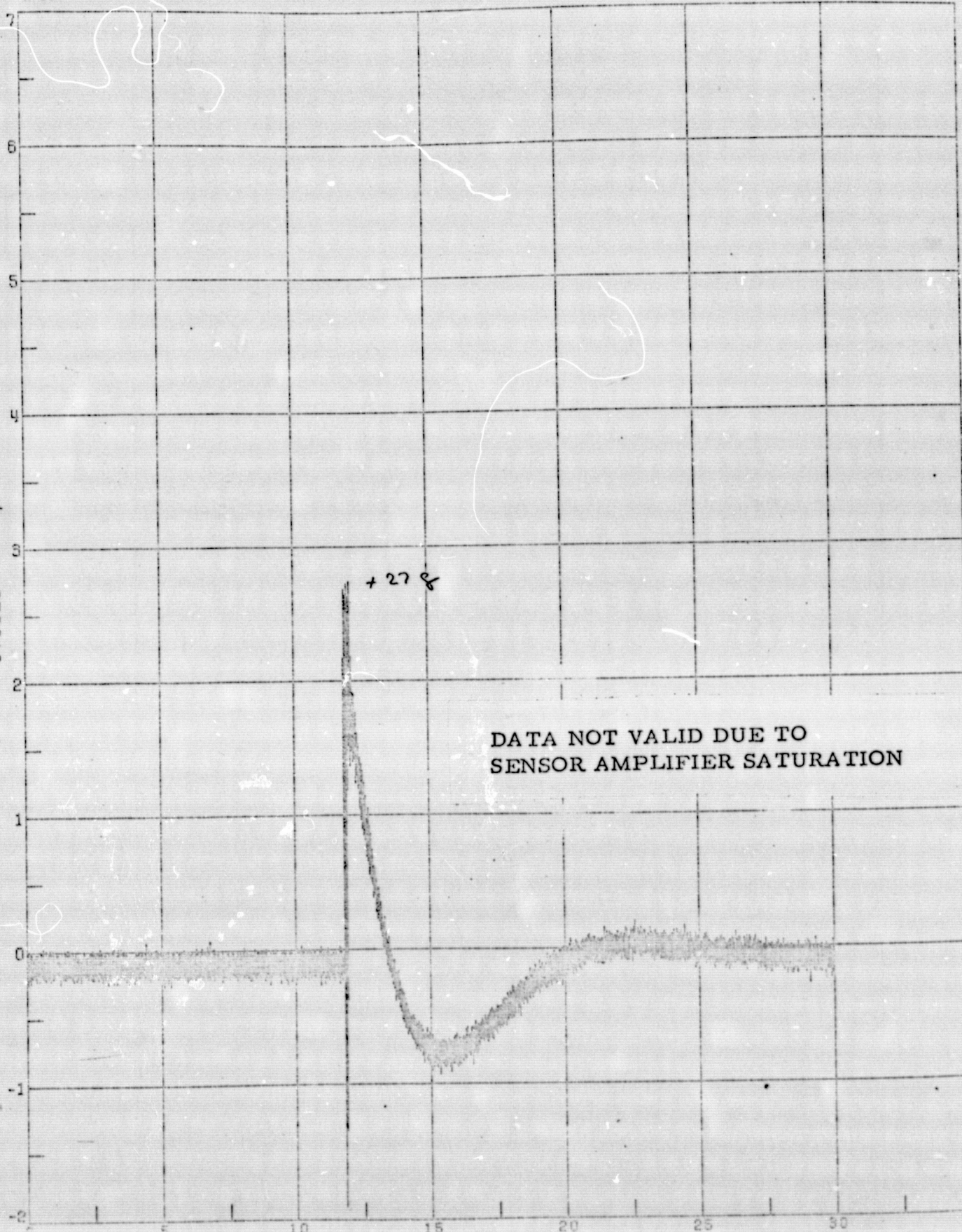
8/ ZODB

33.39b

Figure 3.13b

CY1820 ~ 9

$\times 10^3$

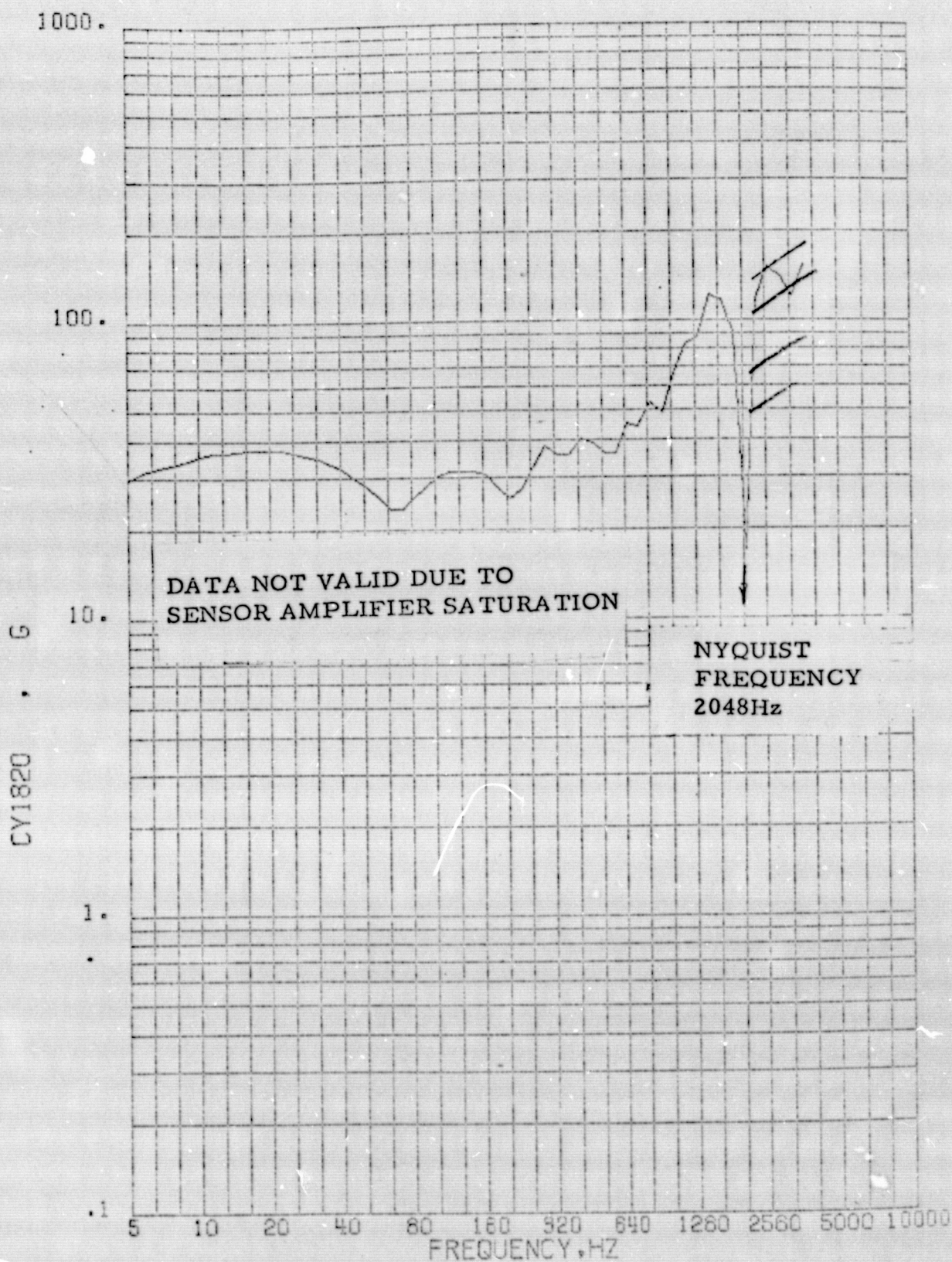


START=77019.0000SEC.

STOP=77022.0000SEC.

3.3130

SHOCK SPECTRUM



START=77020.0000SEC.

STOP=77022.0000SEC.

Q=10.

VIKING A

FB R RELEASE

8/ CY1820

3.311 b

Figure 3.14b

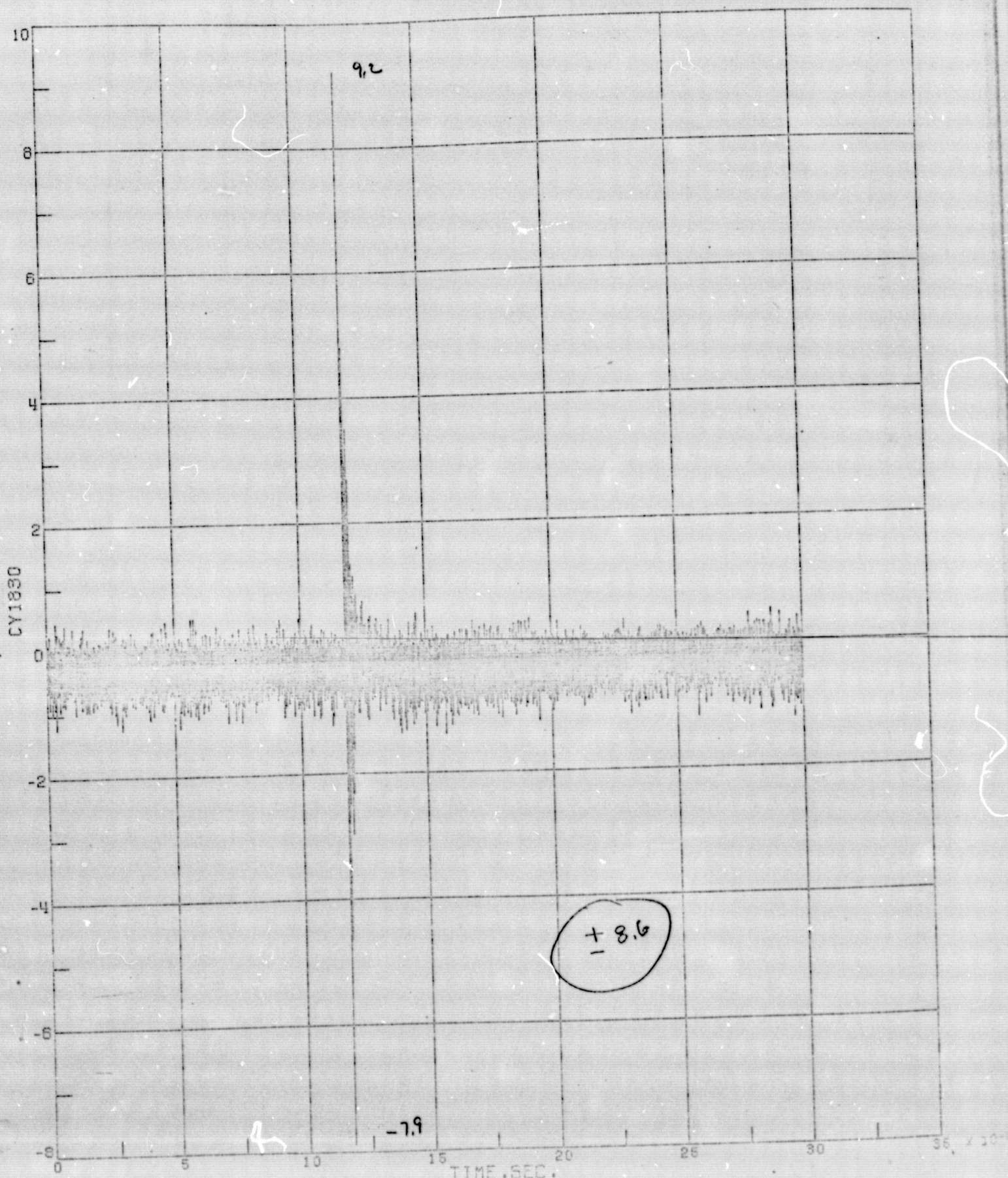
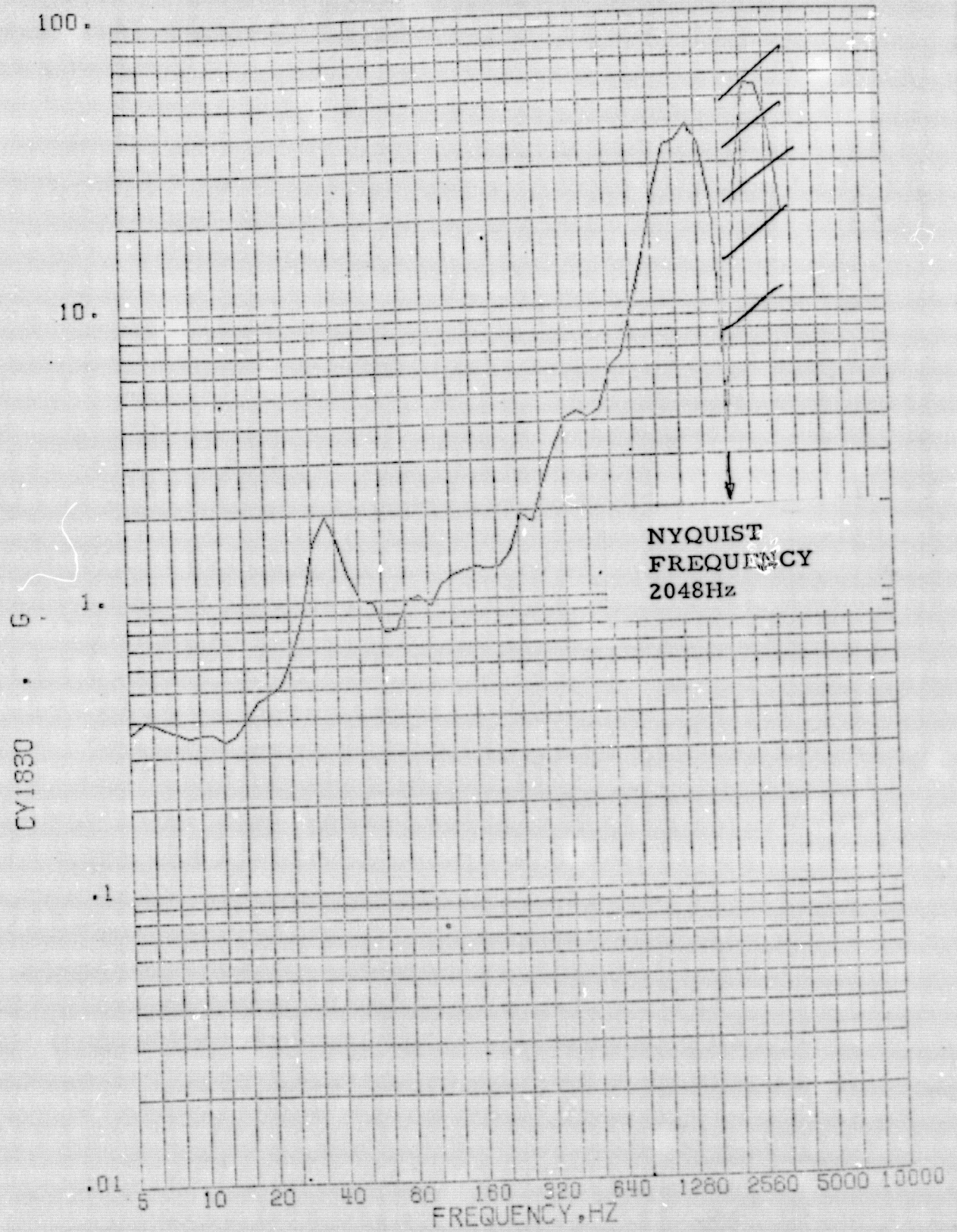


Figure 3.15a

SHOCK SPECTRUM



START=77020.0000SEC.

STOP=77022.0000SEC.

Q=10.

VIKING A

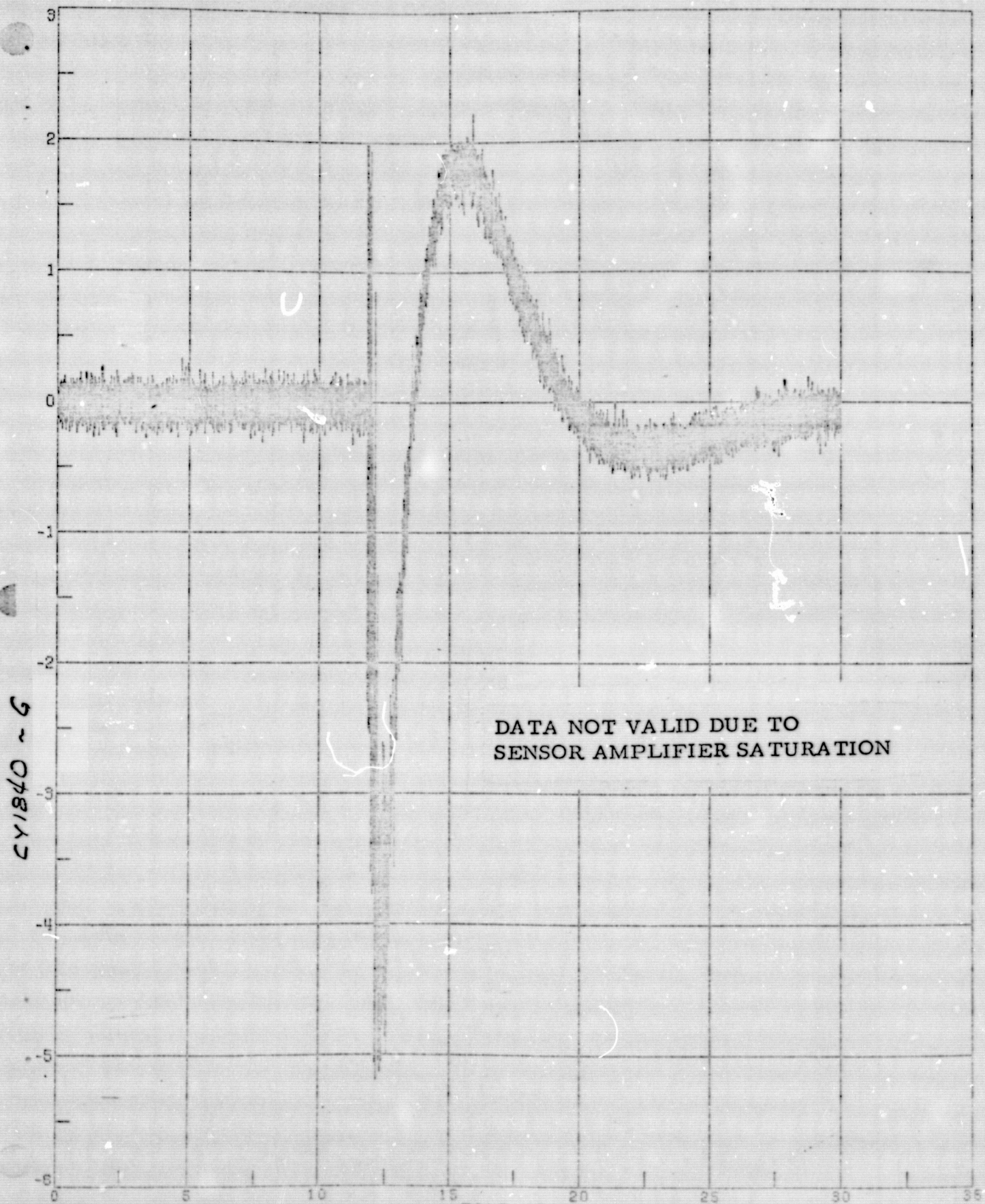
FS R RELEASE

8/ CY1830

3.33 b

Figure 3.15b

ORIGINAL PAGE IS
OF POOR QUALITY



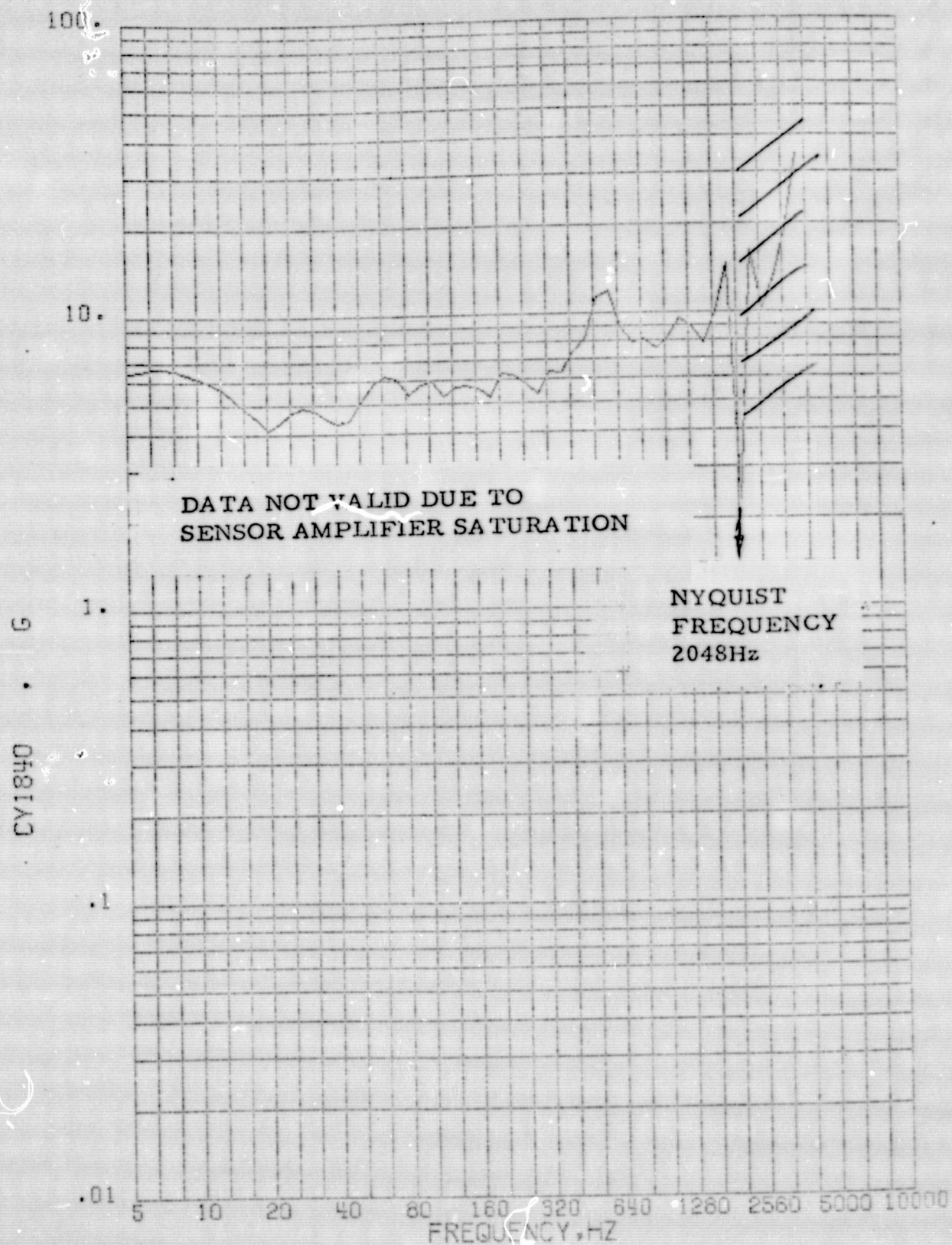
START=77019.0000SEC.

STOP=77022.0000SEC.

3.34

Figure 3.16a

SHOCK SPECTRUM



START=77020.0000SEC.

STOP=77022.0000SEC.

Q=10.

VIKING A

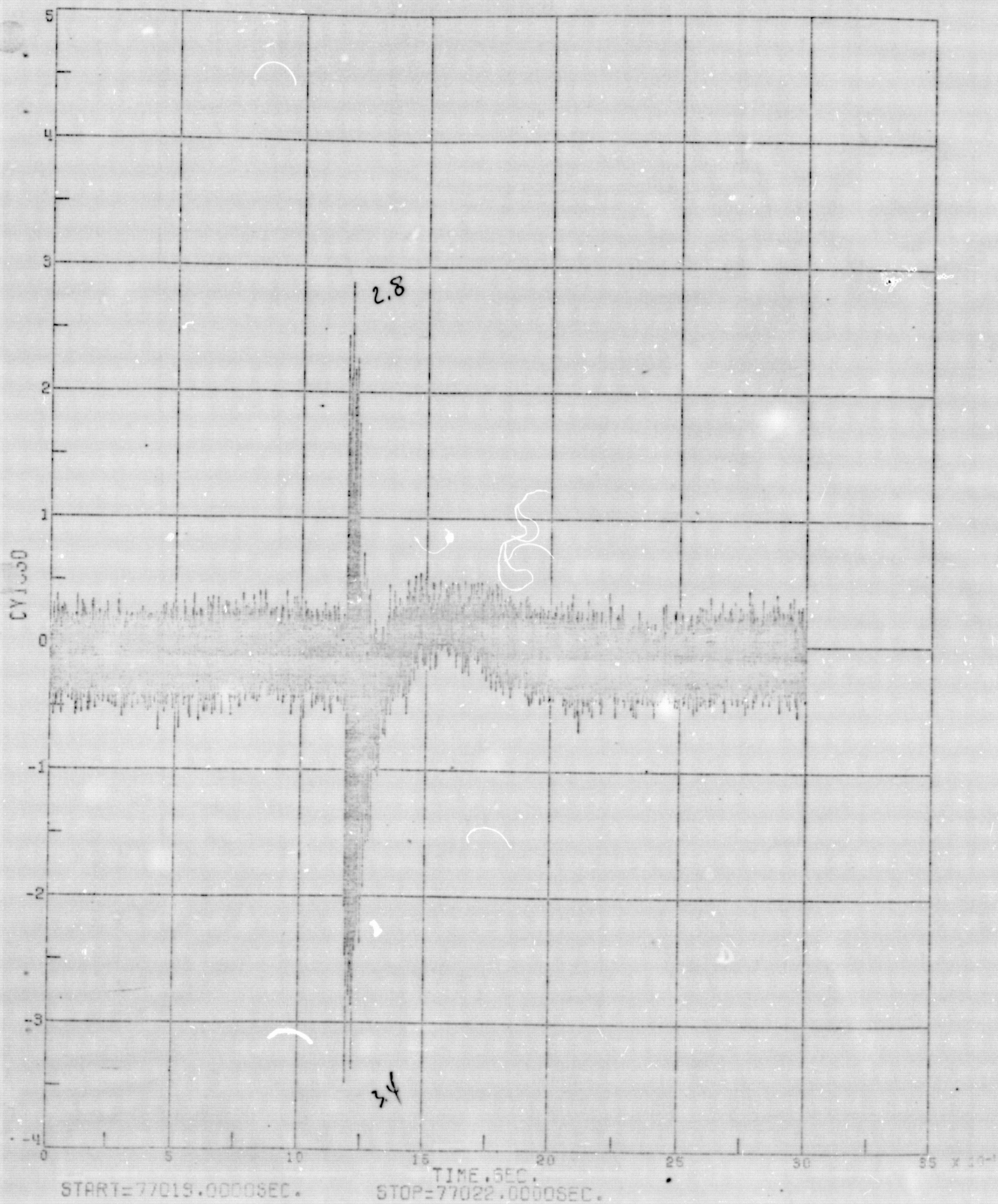
FB R RELEASE

8/ CY1840

3.35
3.16

Figure 3.16b

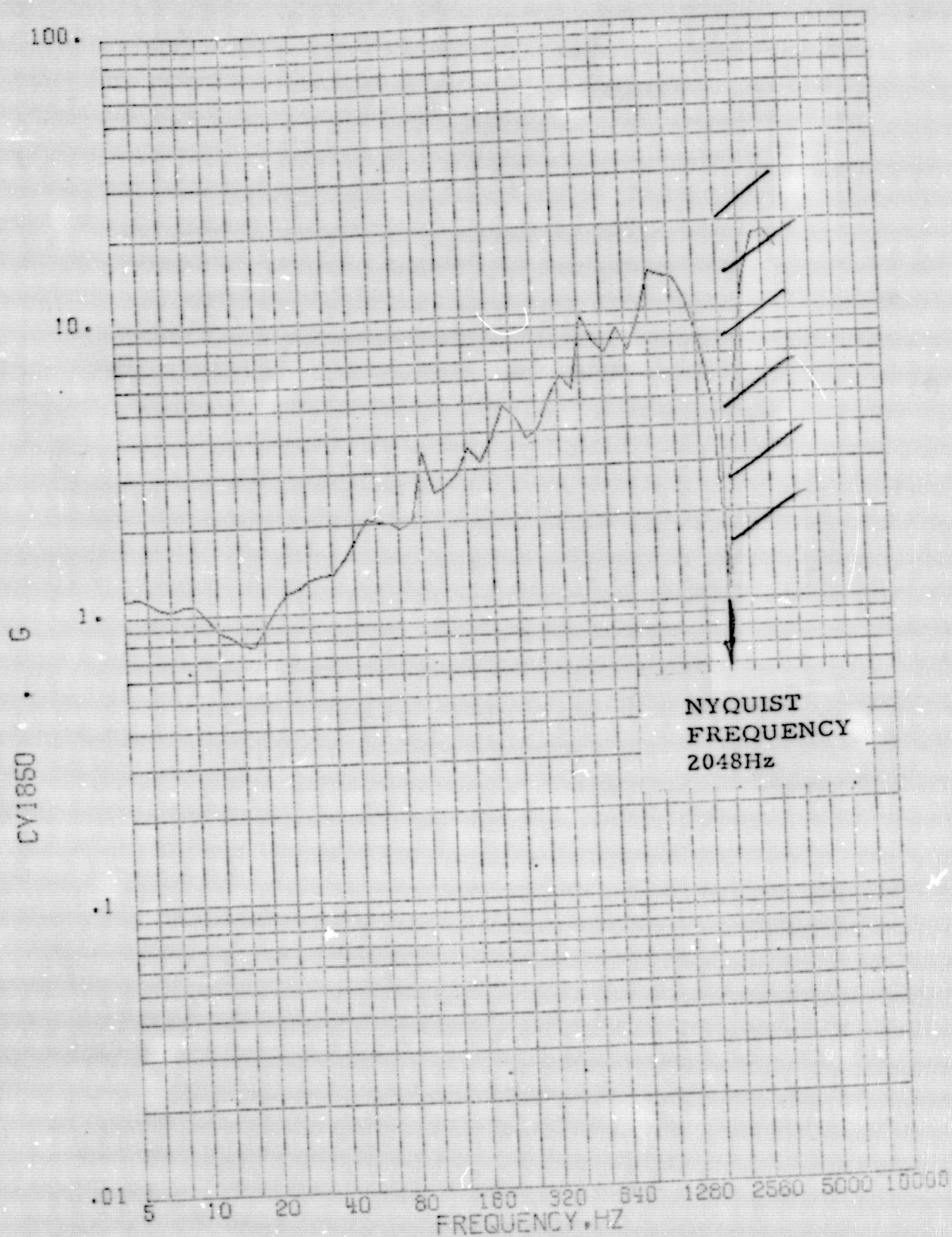
ORIGINAL PAGE IS
OF POOR QUALITY



2.3.36

Figure 3.17a

SHOCK SPECTRUM



START=77020.0000SEC.

STOP=77022.0000SEC.

Q=10.

VIKING A

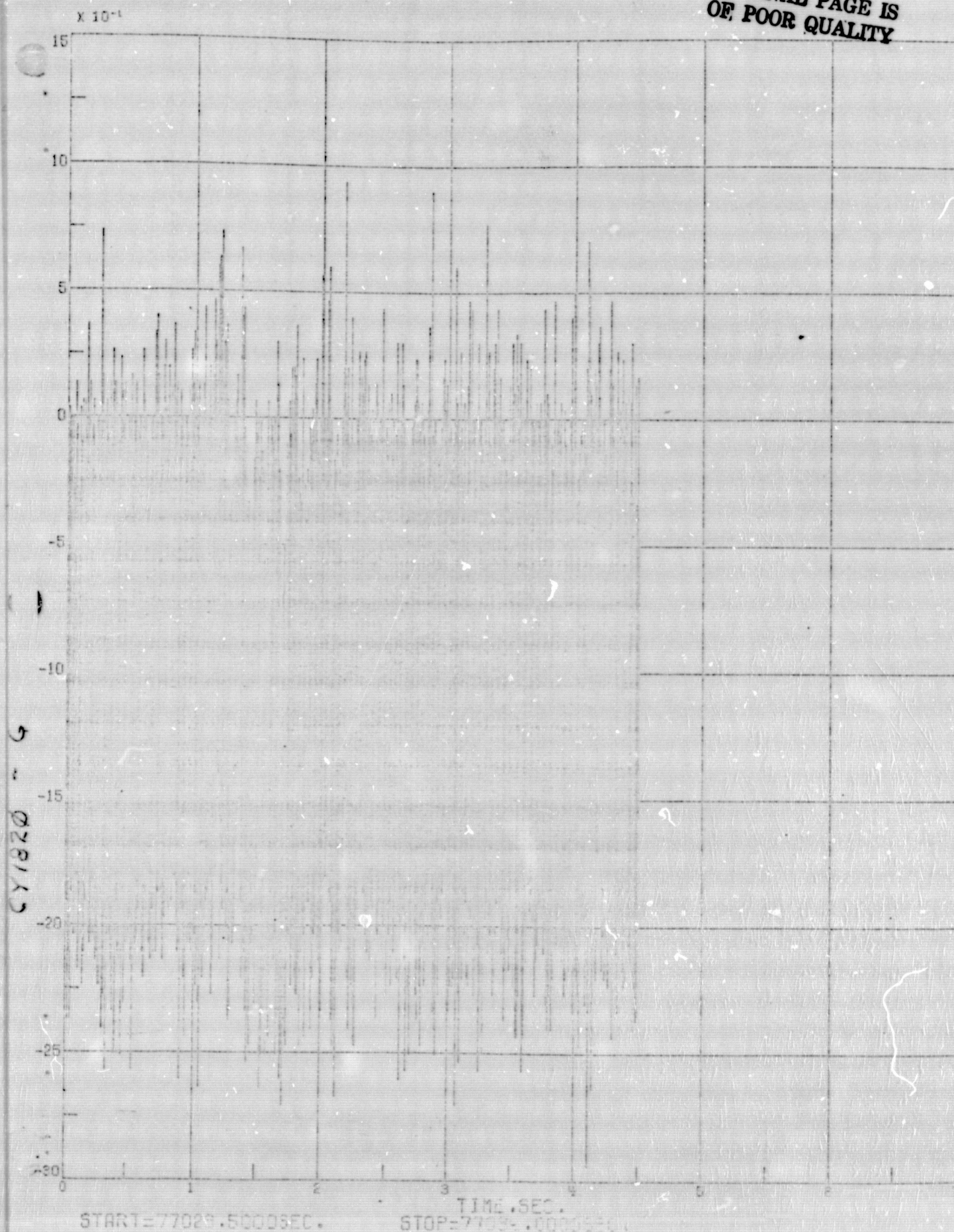
FB R RELEASE

8/ CY1850

3.37
3.17 b

Figure 3.17b

ORIGINAL PAGE IS
OF POOR QUALITY

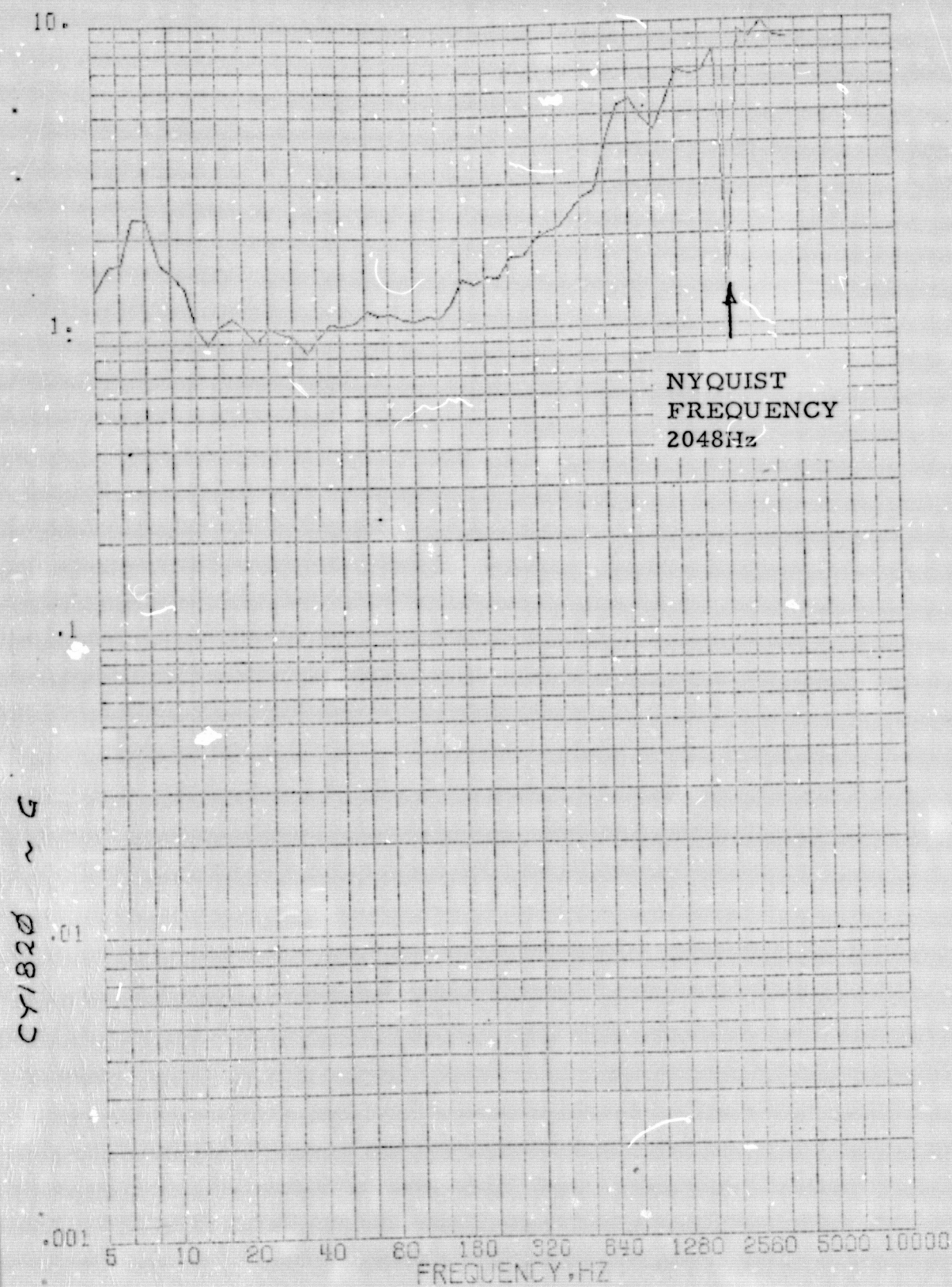


3.189 3.38

Figure 3.18a

(11)

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

0=10.

VIKING R

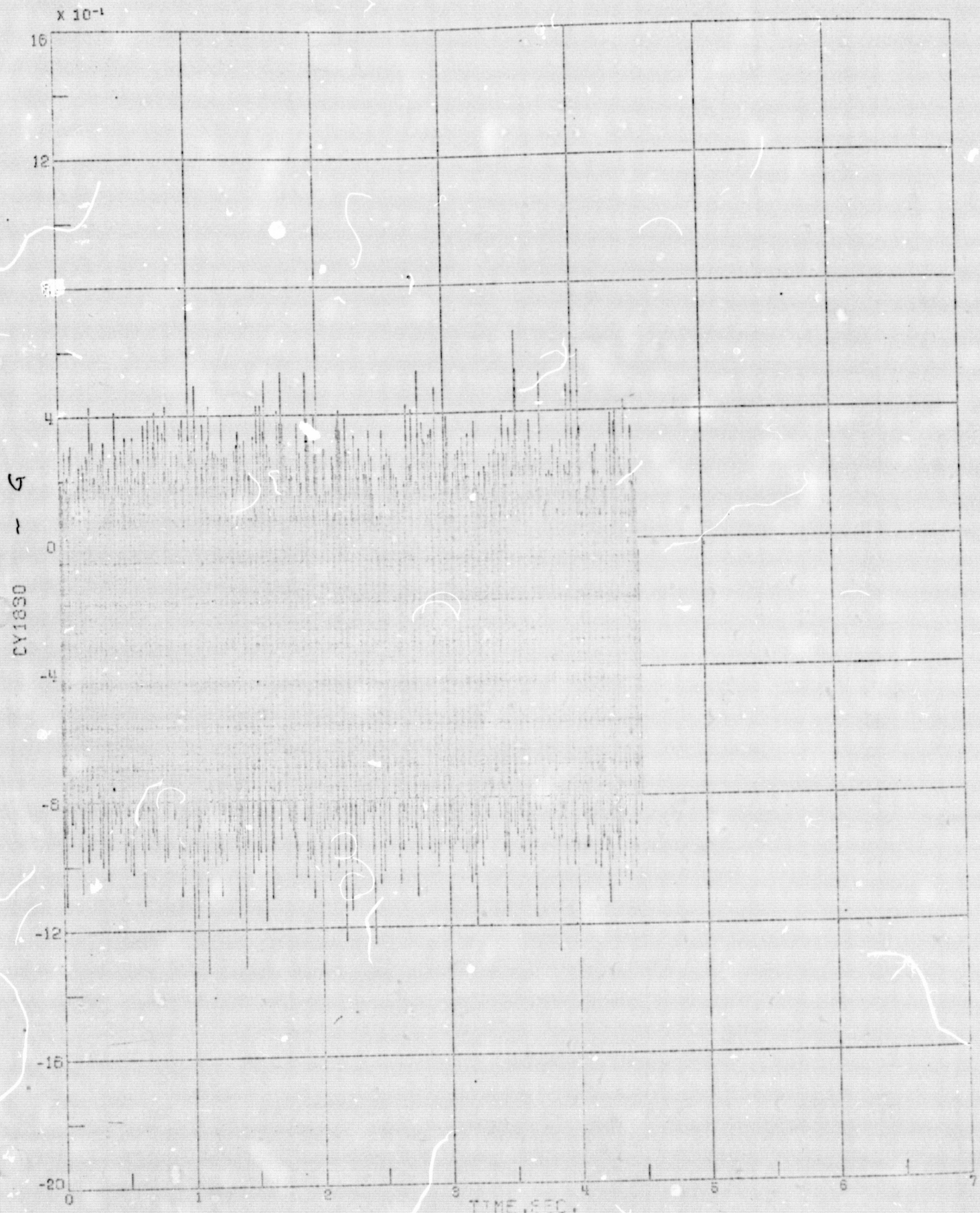
ST G I IGN

8/ CY1820

3.13b 3.39

Figure 3.18b

ORIGINAL PAGE IS
OF POOR QUALITY



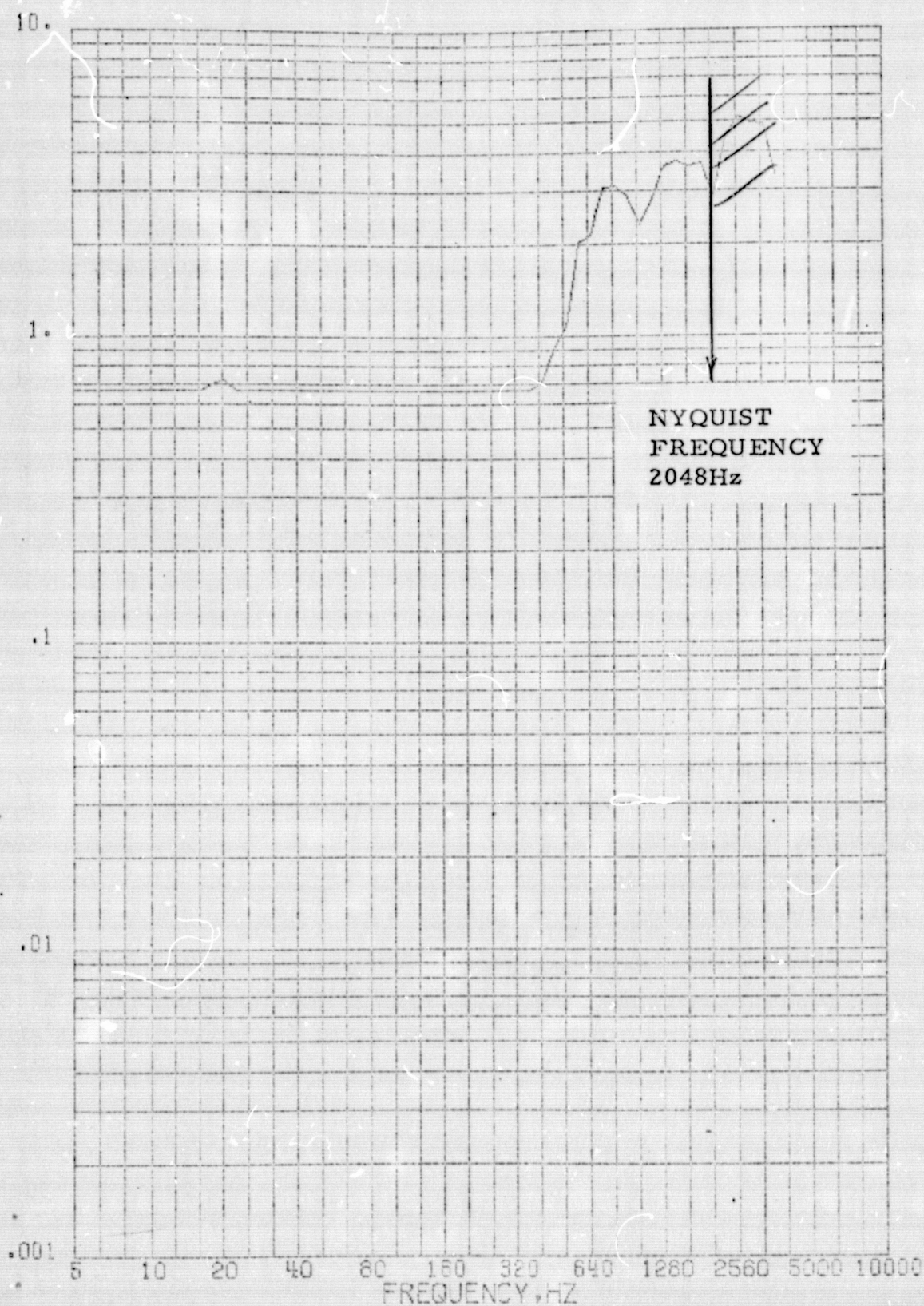
START=77029.5000SEC.

STOP=77034.0000SEC.

3.19 a 3.40

Figure 3.19a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

VIKING A

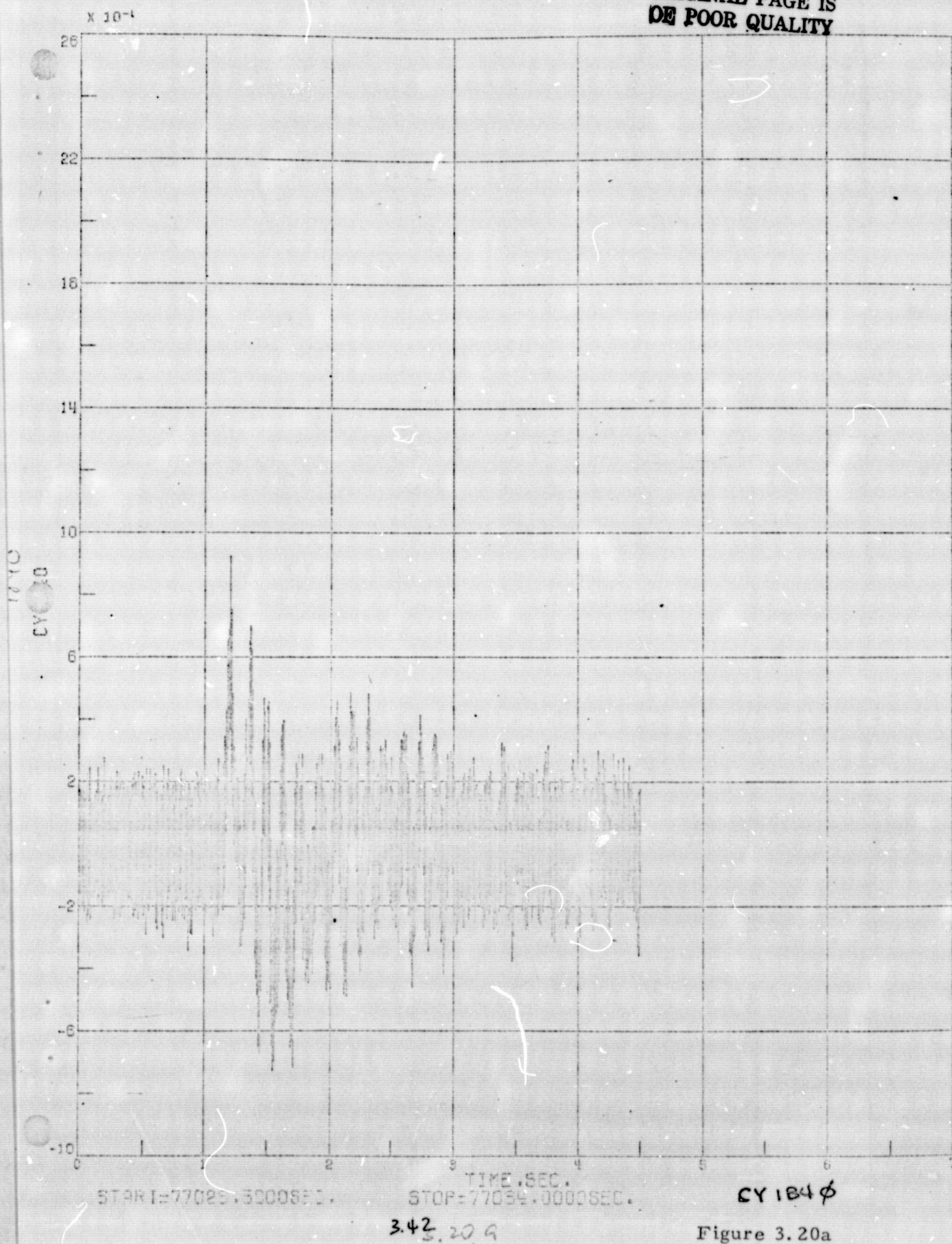
ST G I 1GN

8/ CY1830

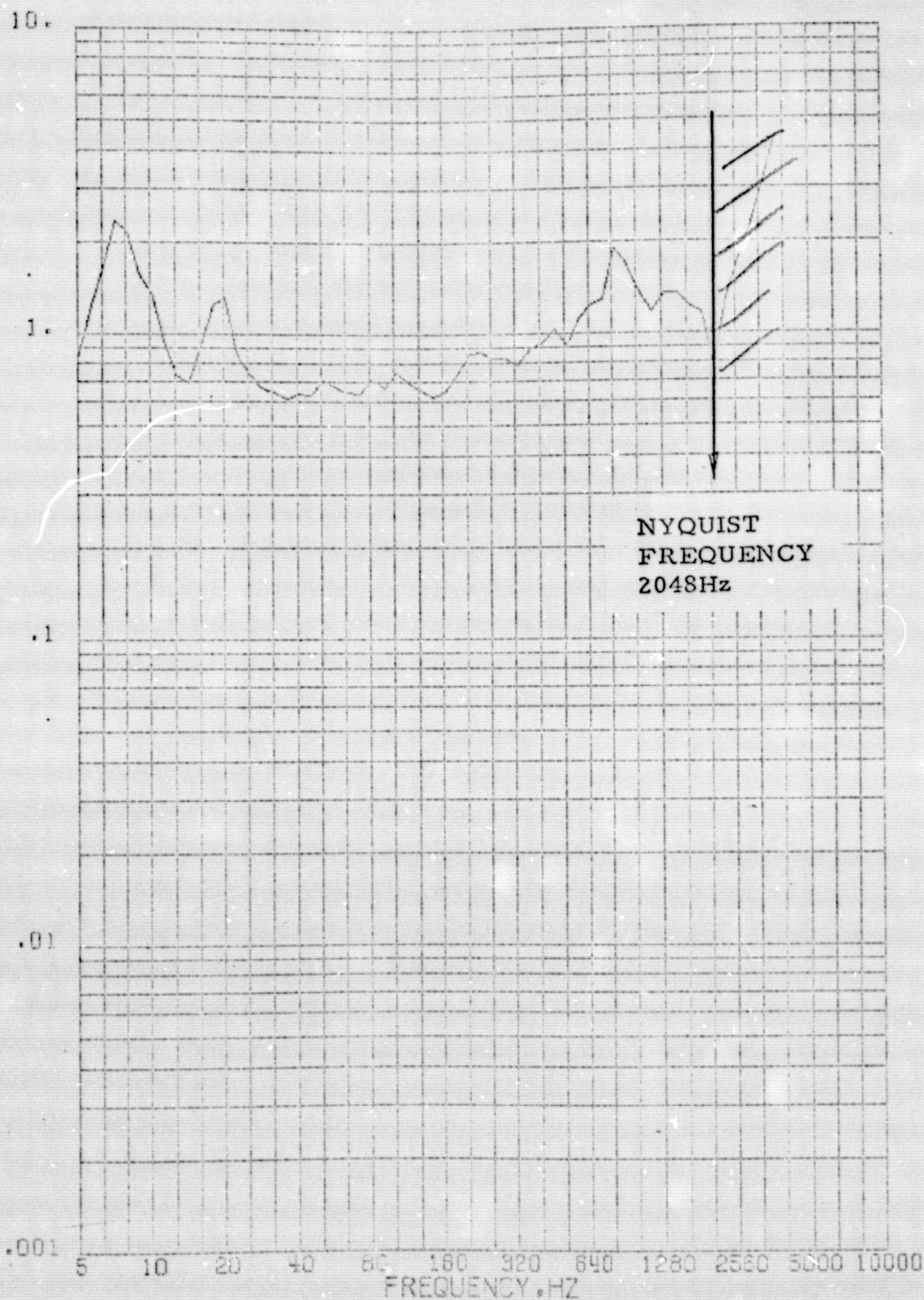
3.41 3.19 b

Figure 3.19b

ORIGINAL PAGE IS
OF POOR QUALITY



SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

VIKING A

ST 6 T IGN

8/ CY1840

3.43
3.20 b

Figure 3.20b

ORIGINAL PAGE IS
OF POOR QUALITY

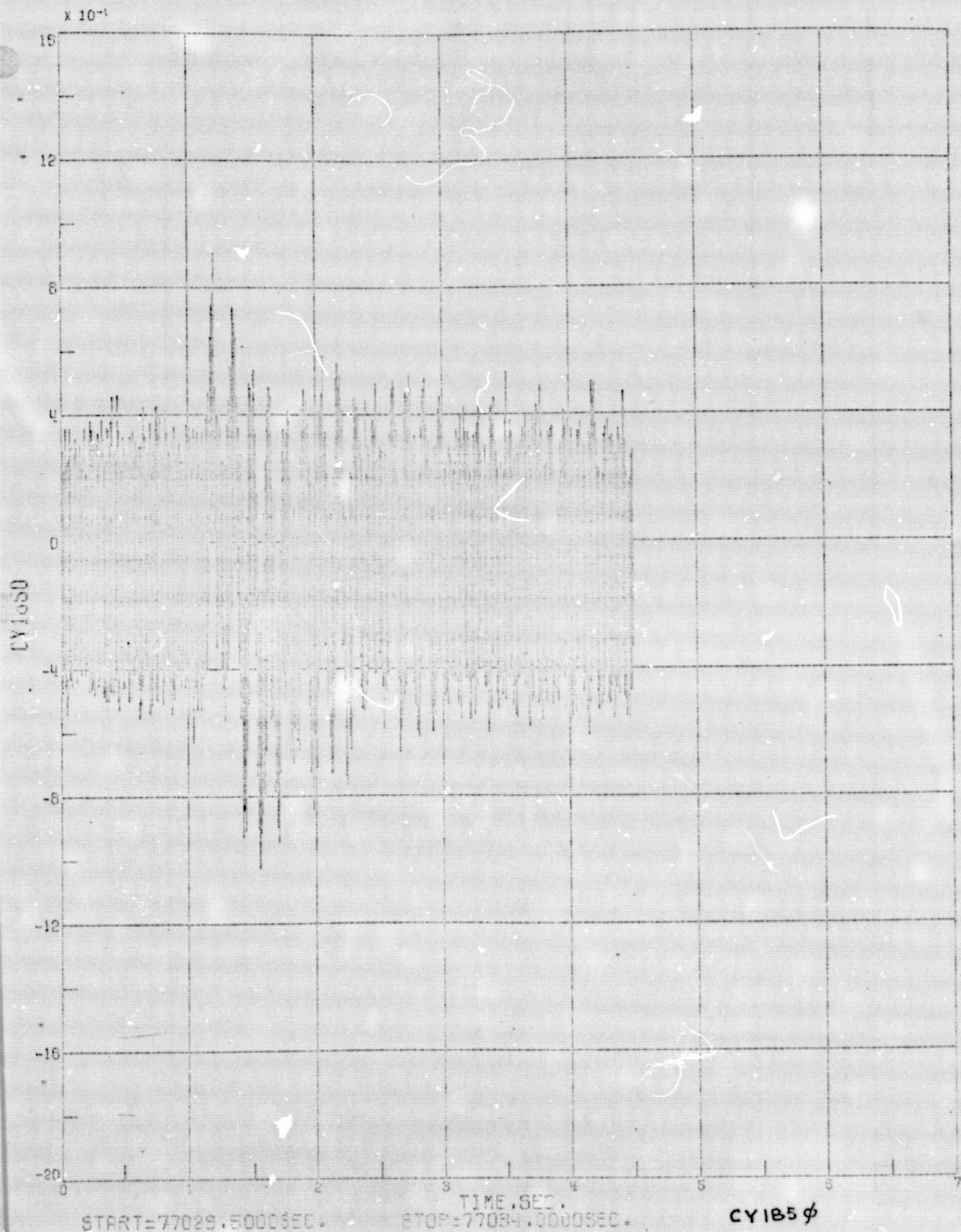
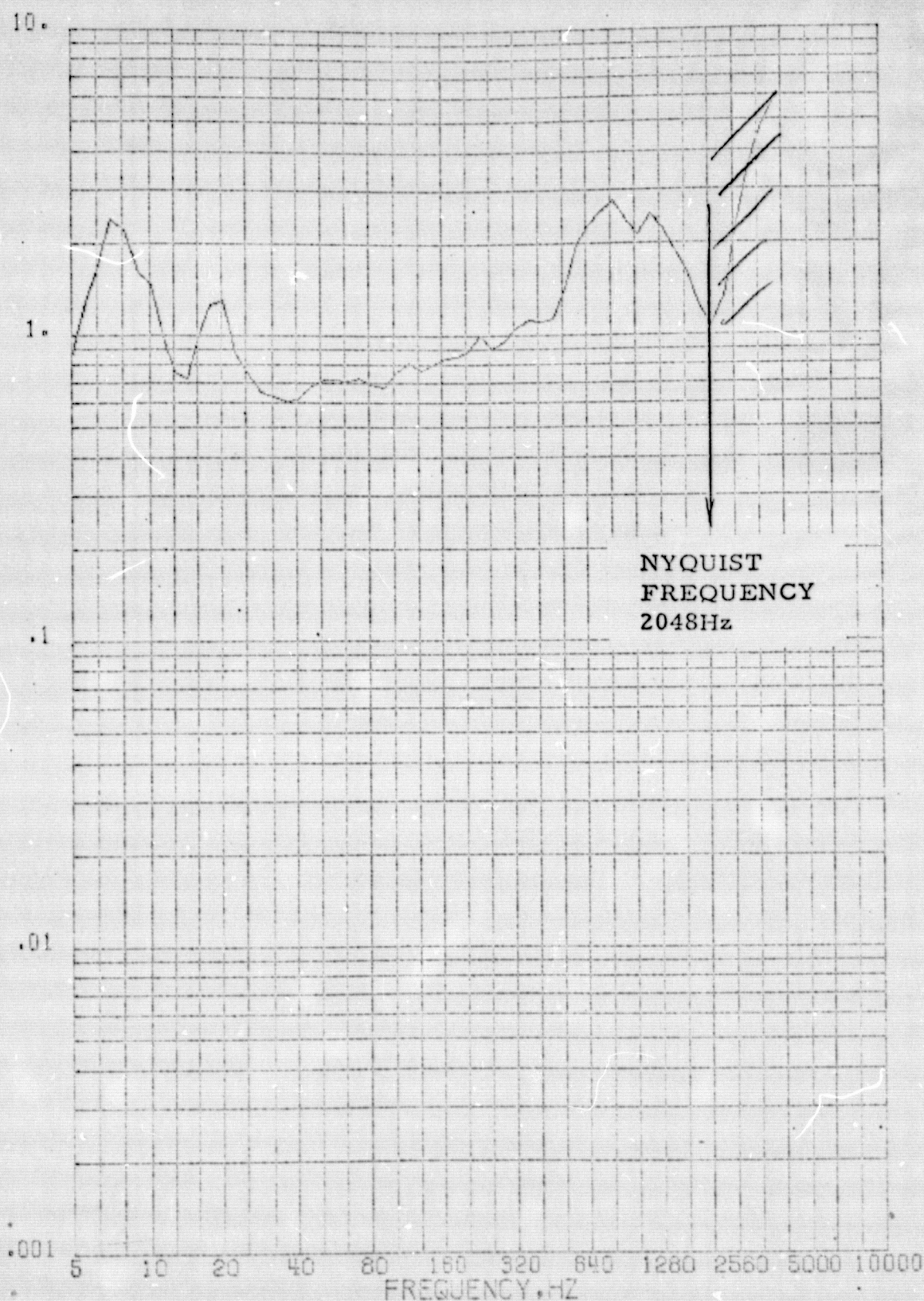


Figure 3.21a

SHOCK SPECTRUM



START=77030.0000SEC. STOP=77034.0000SEC. Q=10.

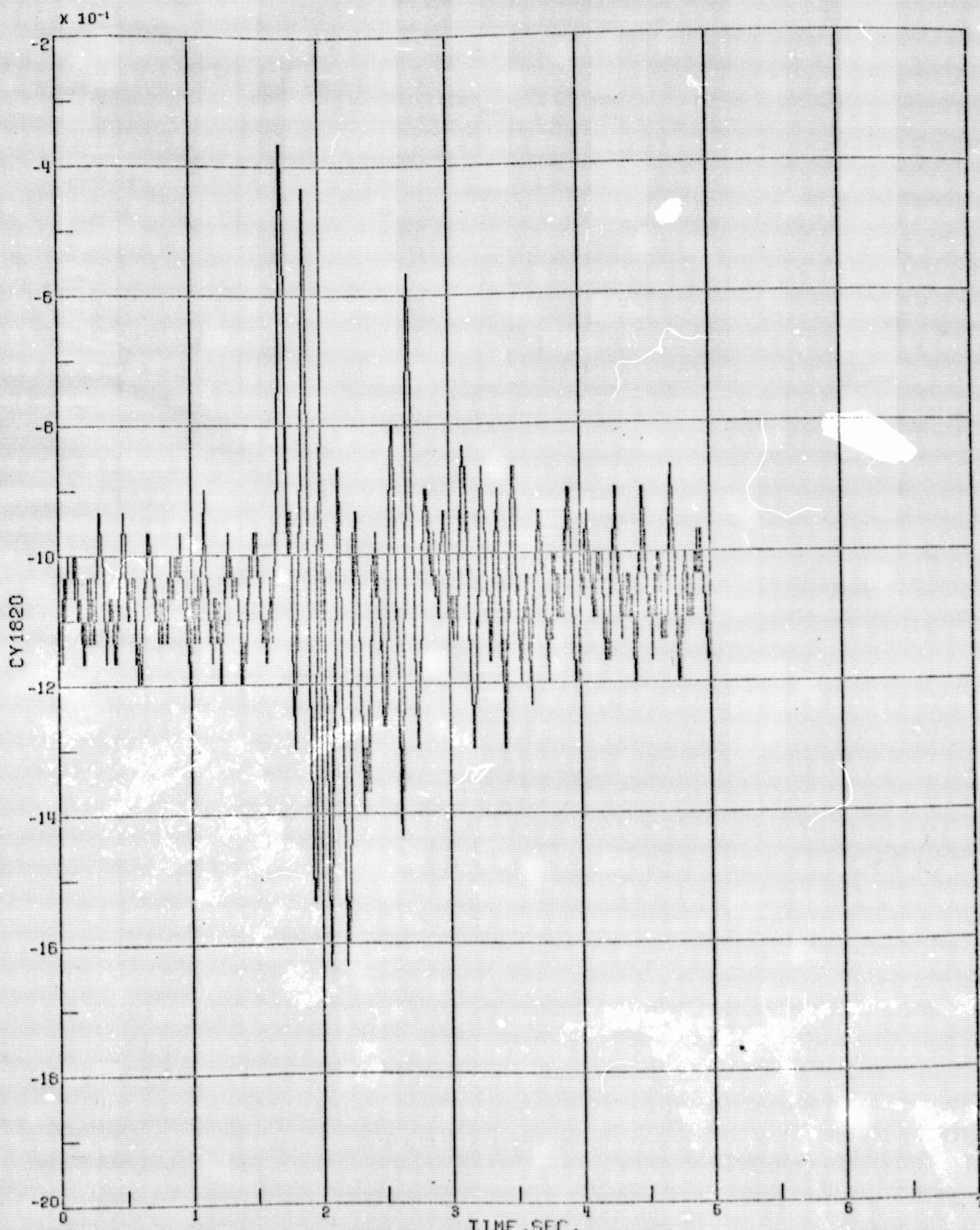
VIKING A

ST G IGN

8/ CY1850

3.45
3.21 b

Figure 3.21b



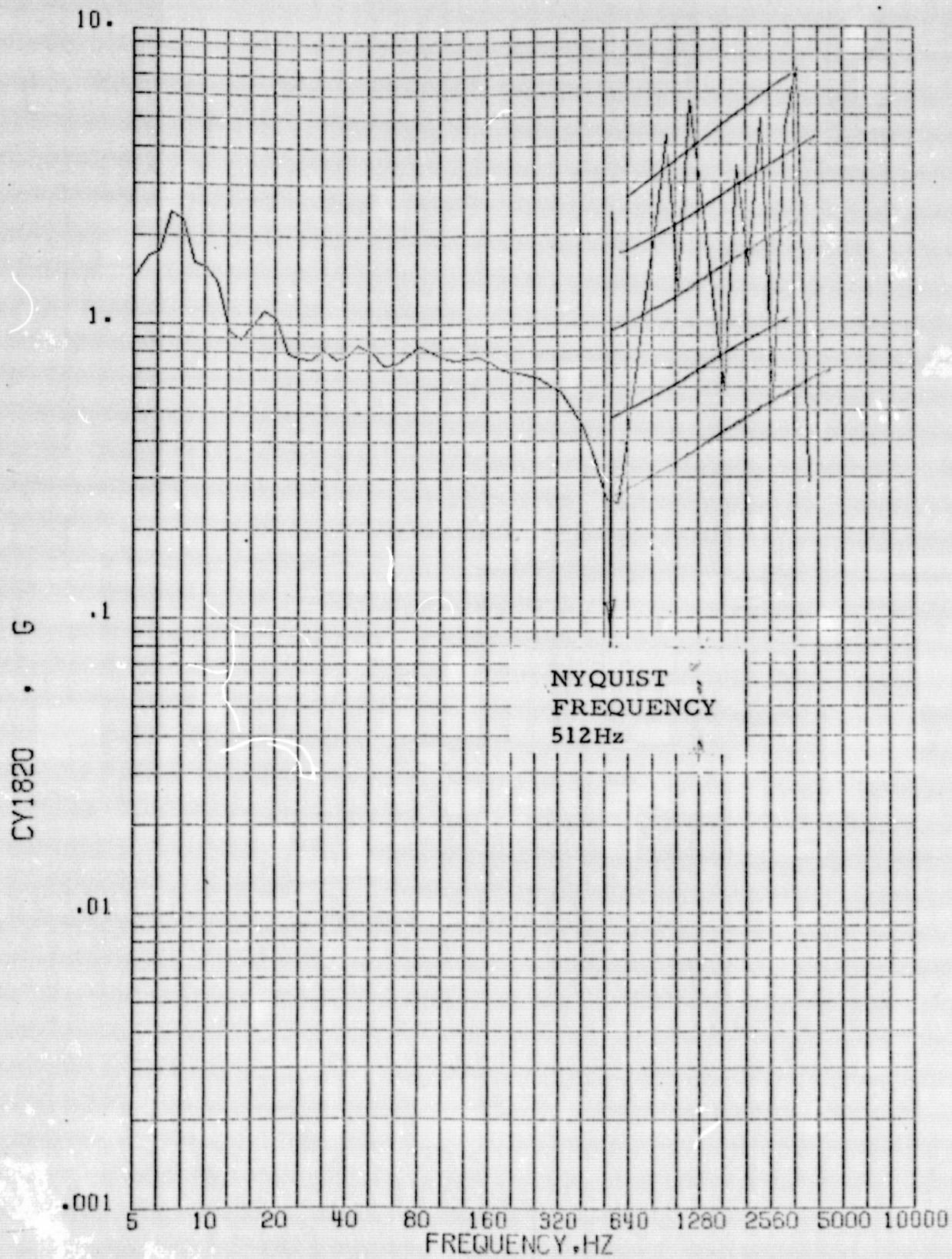
START=77029.0000SEC.

STOP=77034.0000SEC.

3.46
3.229

Figure 3.22a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

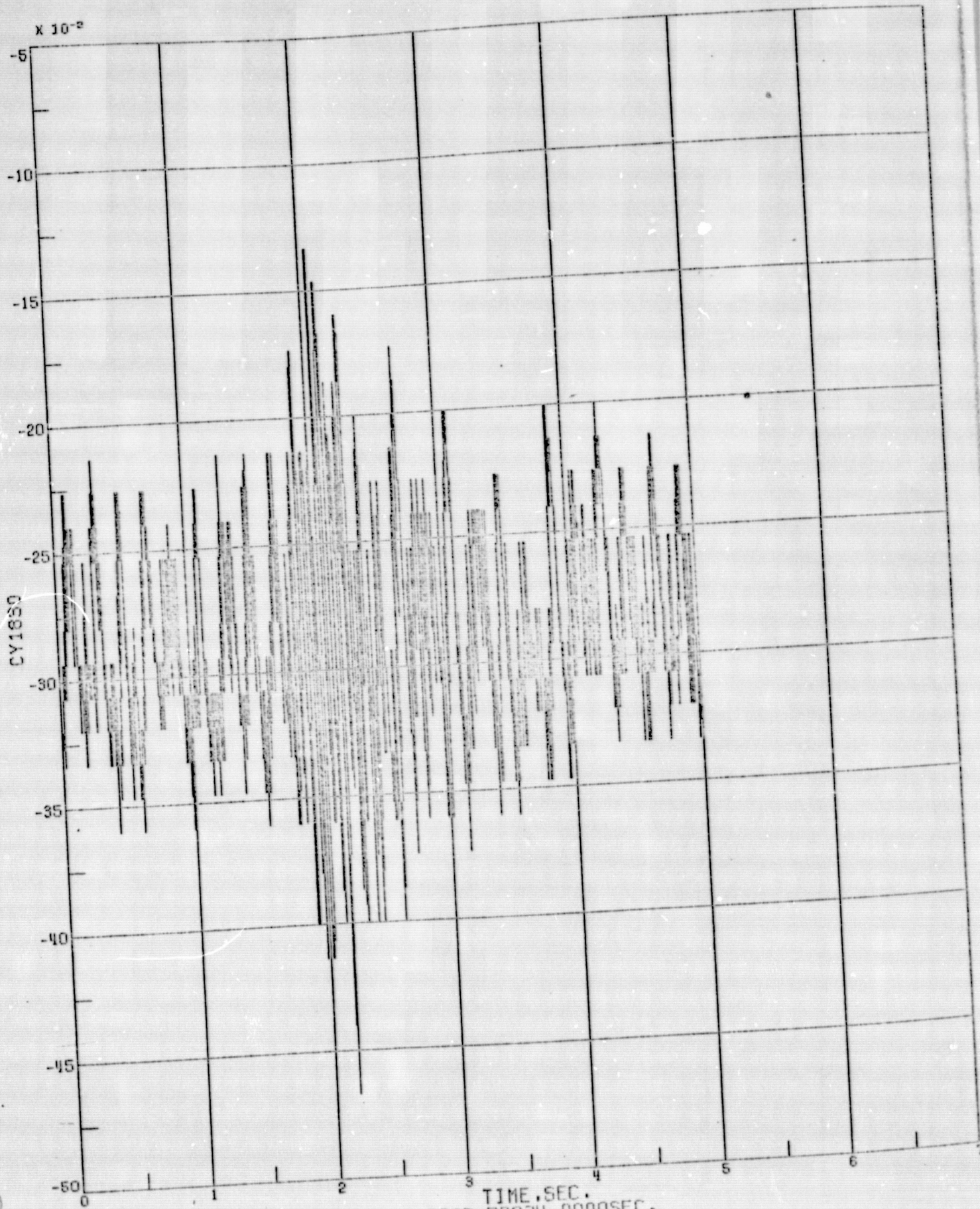
VIKING A

ST G I IGN

8/ CY1820

347.22 b

Figure 3.22b



START=77029.0000SEC.

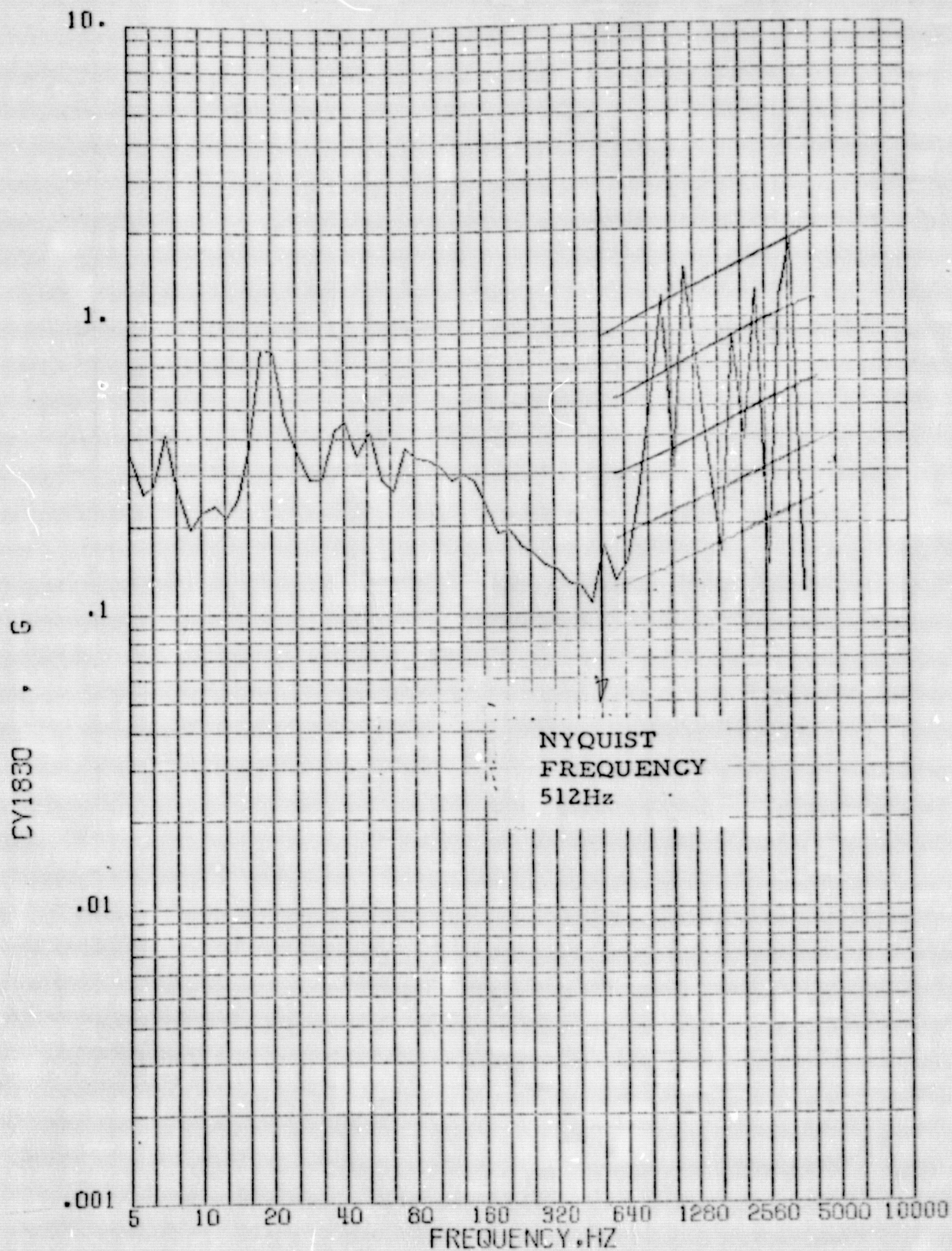
STOP=77034.0000SEC.

3.48

3.229

Figure 3.23a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

0=10.

VIKING R

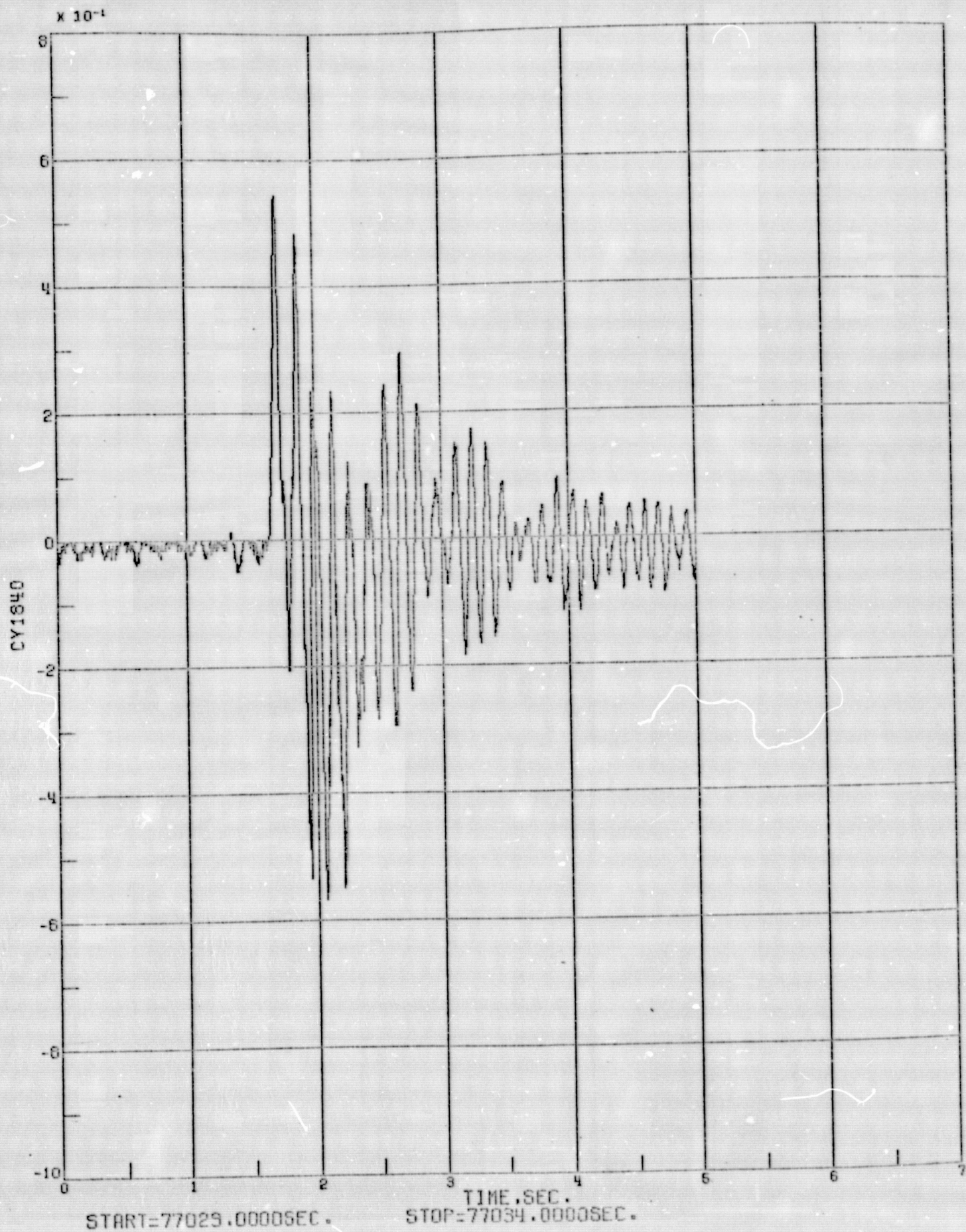
ST G I 16N

8/ CY1830

3.49

3.23b

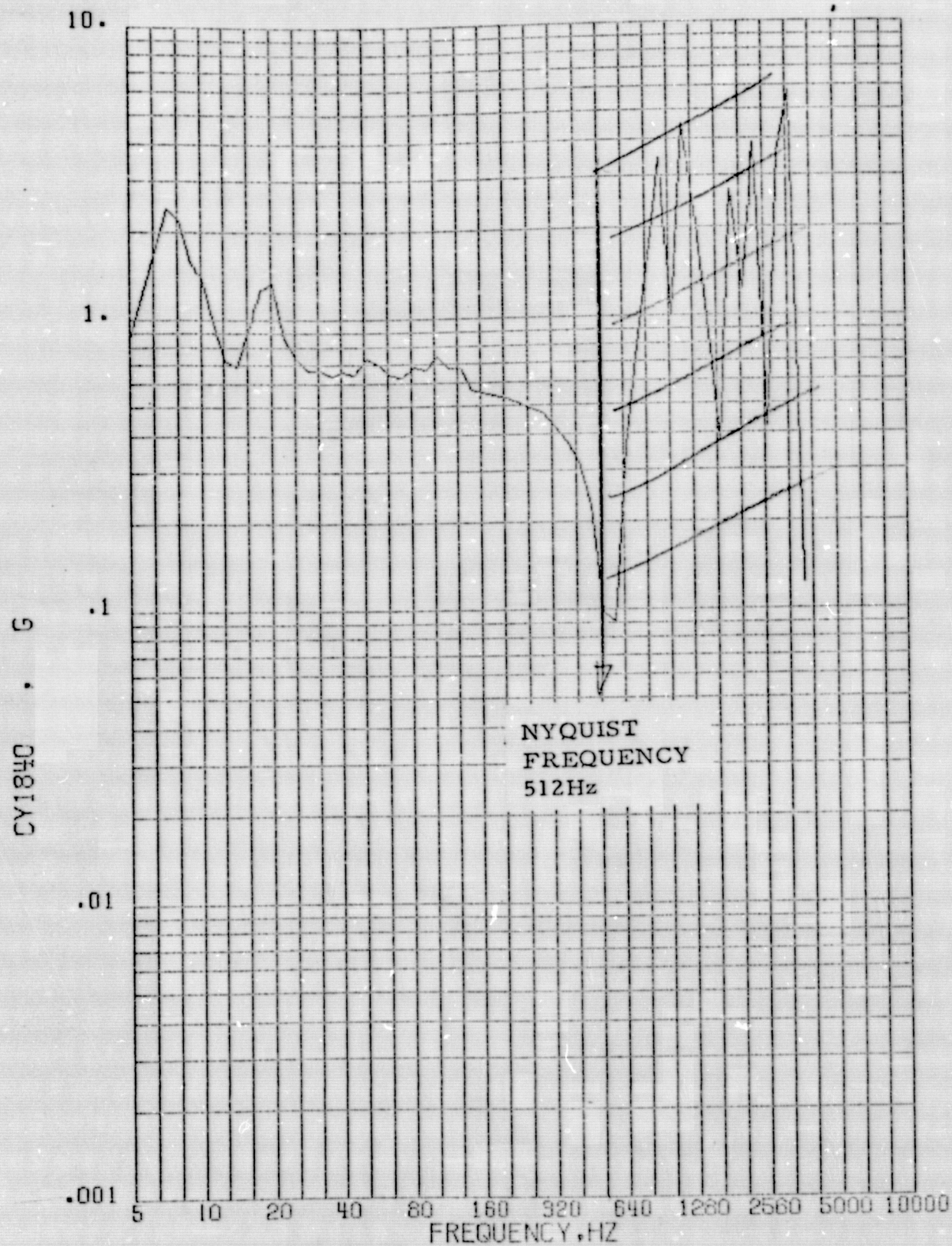
Figure 3.23b



3,350

Figure 3.24a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

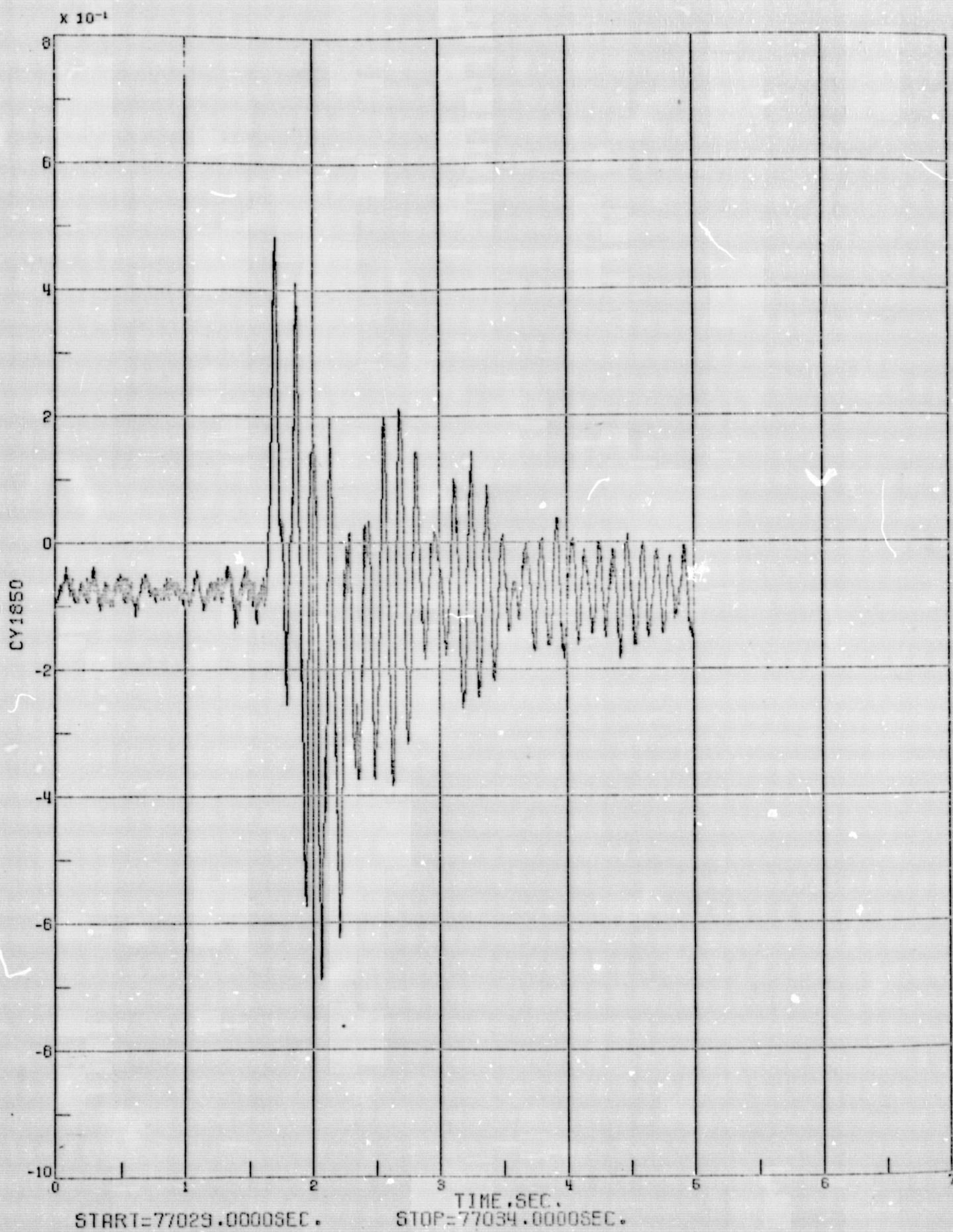
VIKING A

ST G I 16N

8/ CY1840

3.51 3.2d.b

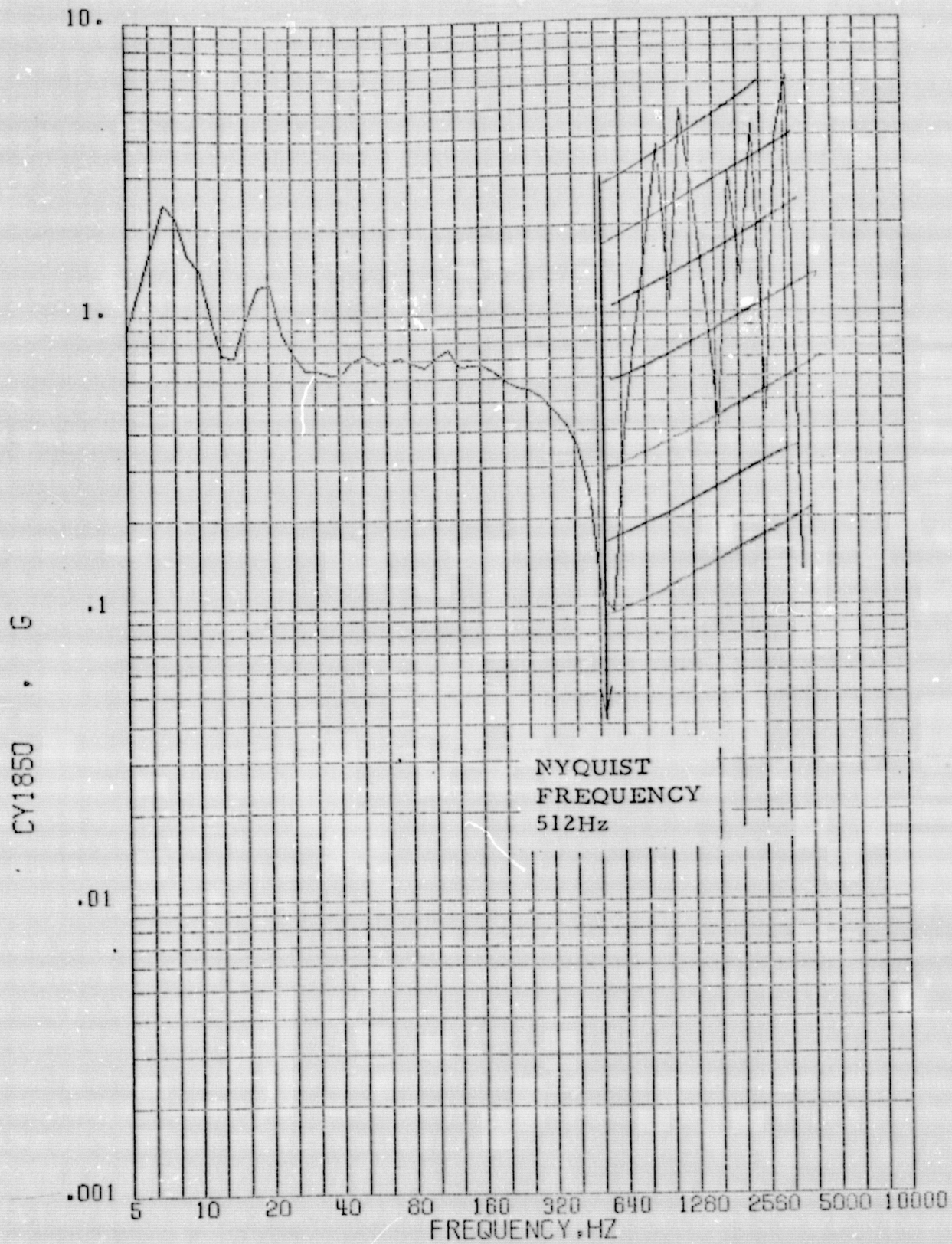
Figure 3.24b



3.5259

Figure 3.25a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

VIKING A

ST G I 16N

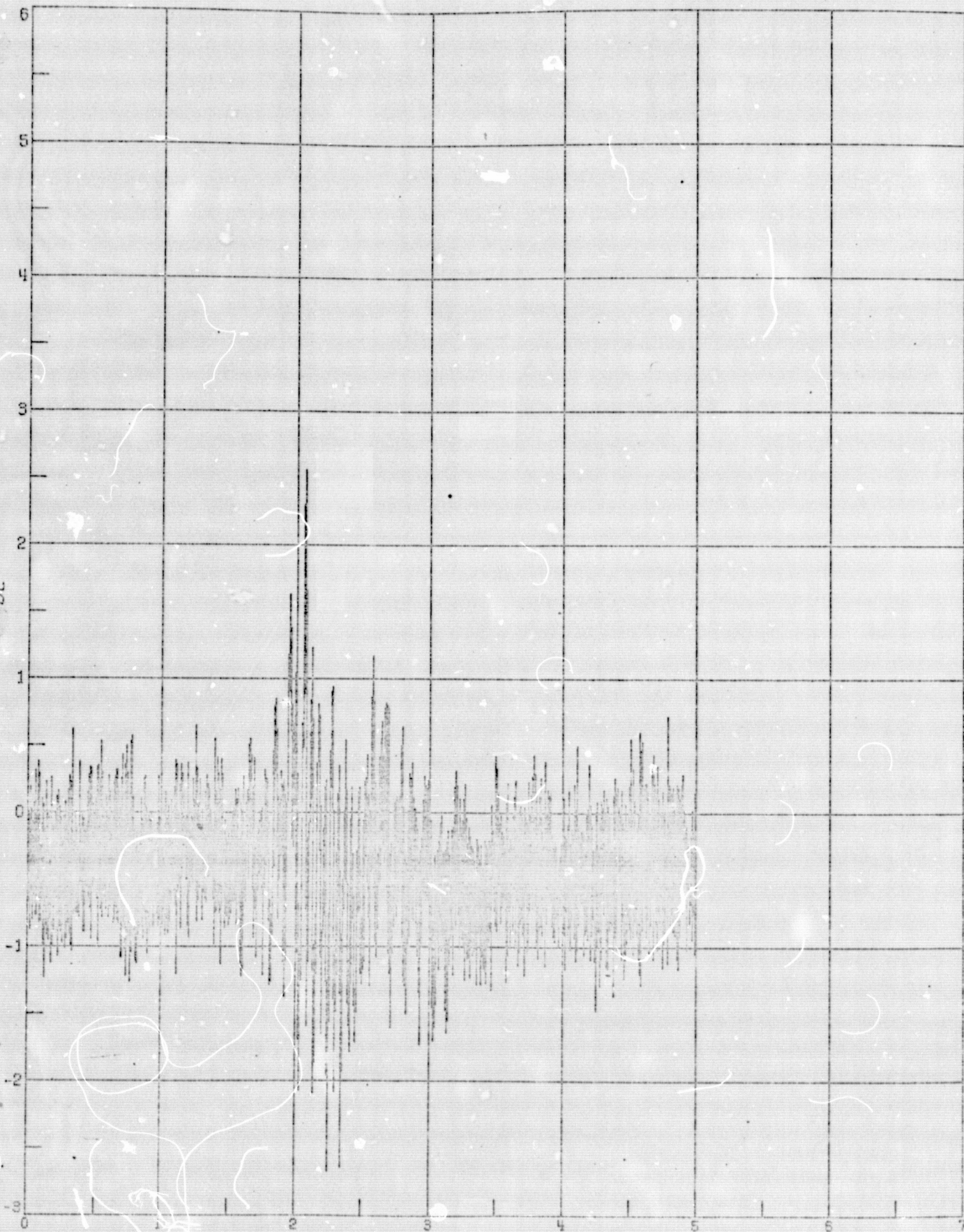
8/ CY1850

3.53

Figure 3.25b

ORIGINAL PAGE IS
OF POOR QUALITY

$\times 10^{-1}$



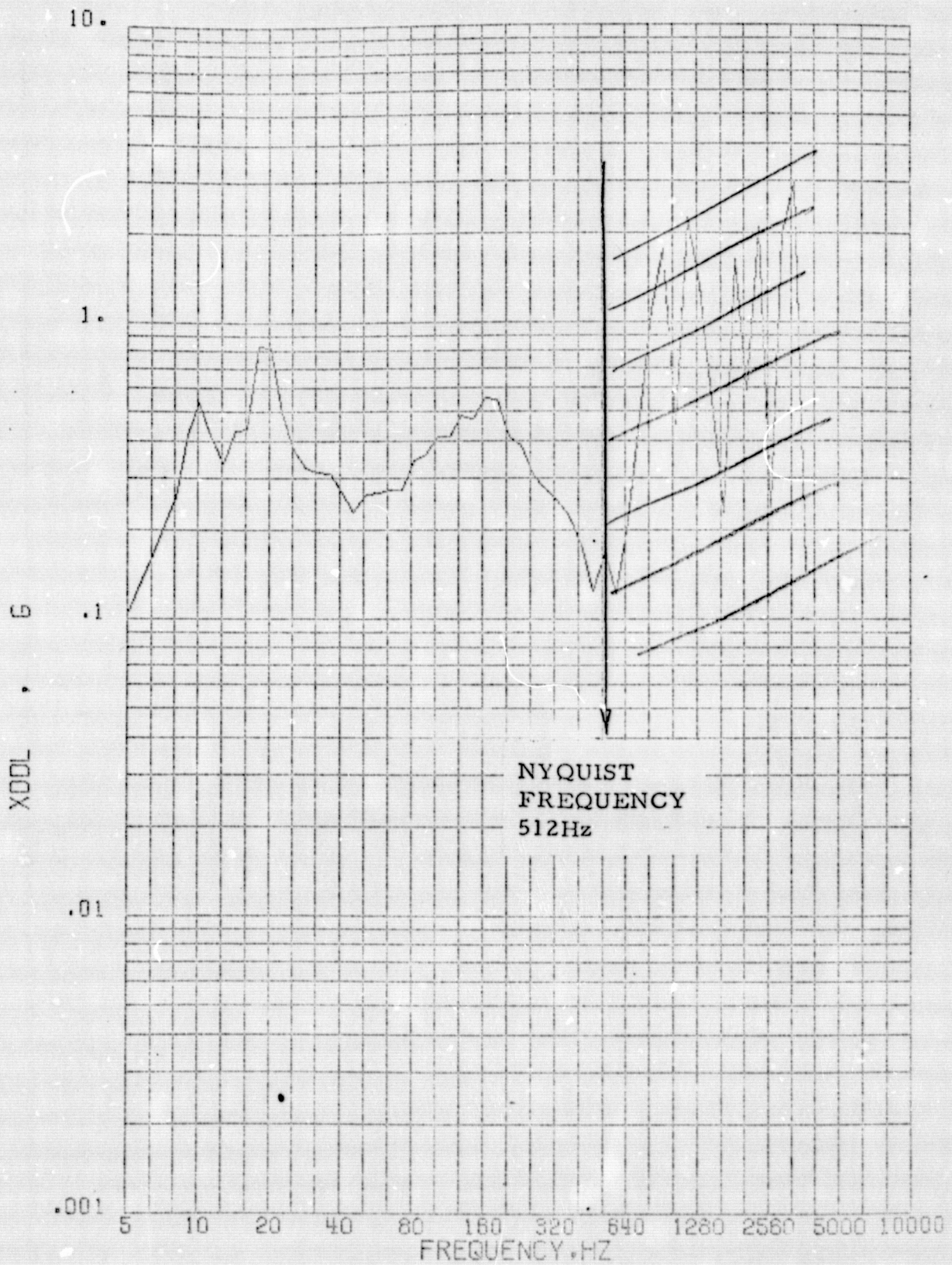
START=77029.0000SEC.

TIME, SEC.
STOP=77034.0000SEC.

3,54, 9

Figure 3.26a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

VIKING A

ST G I IGN

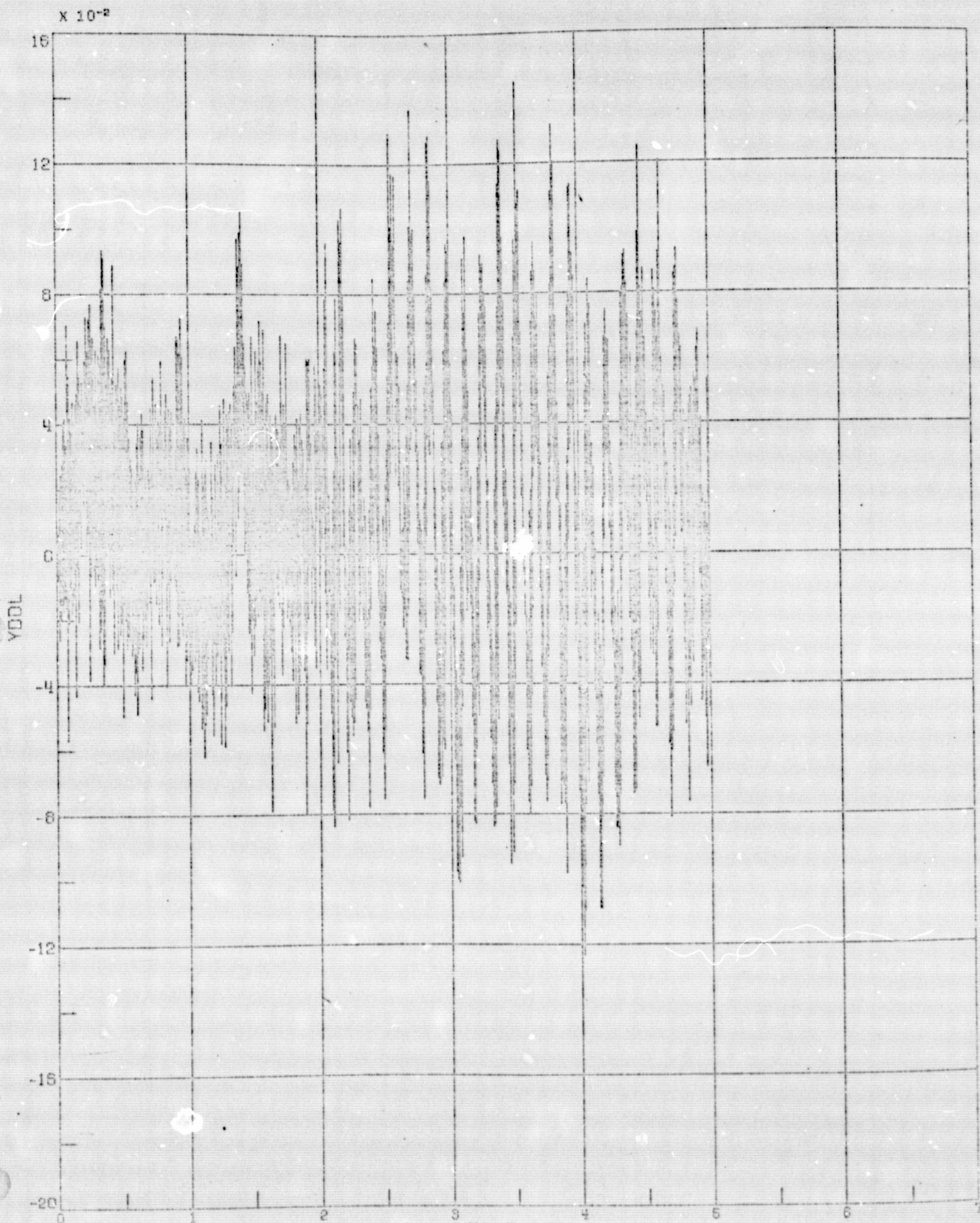
8/

XDDL

3.55 3.26 b

Figure 3.26b

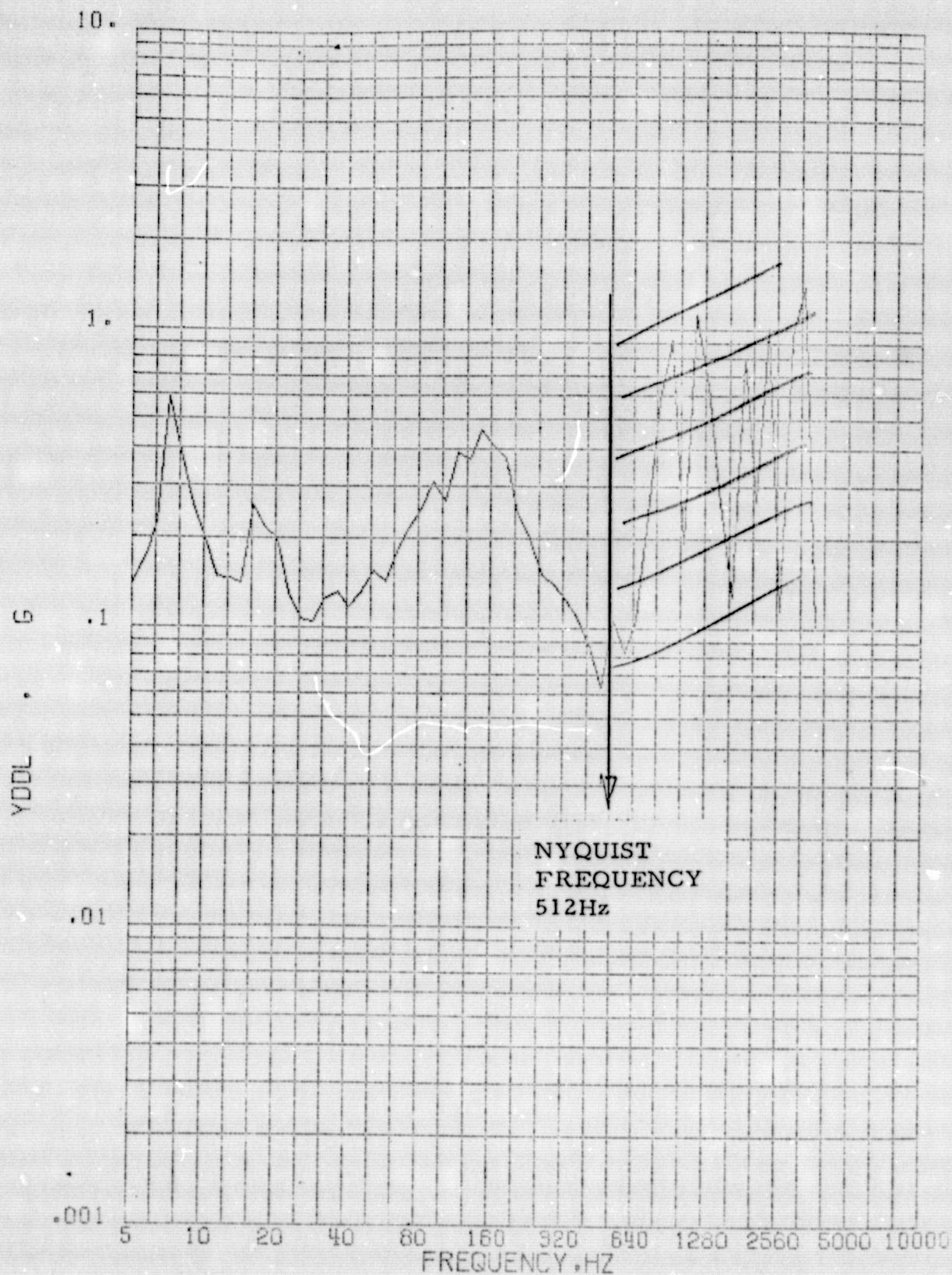
Lat



3.56
31279

Figure 3.27a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

VIKING A

ST G I IGN

8/ YDDL

3.57 3.27, 6

Figure 3.27b

Lat

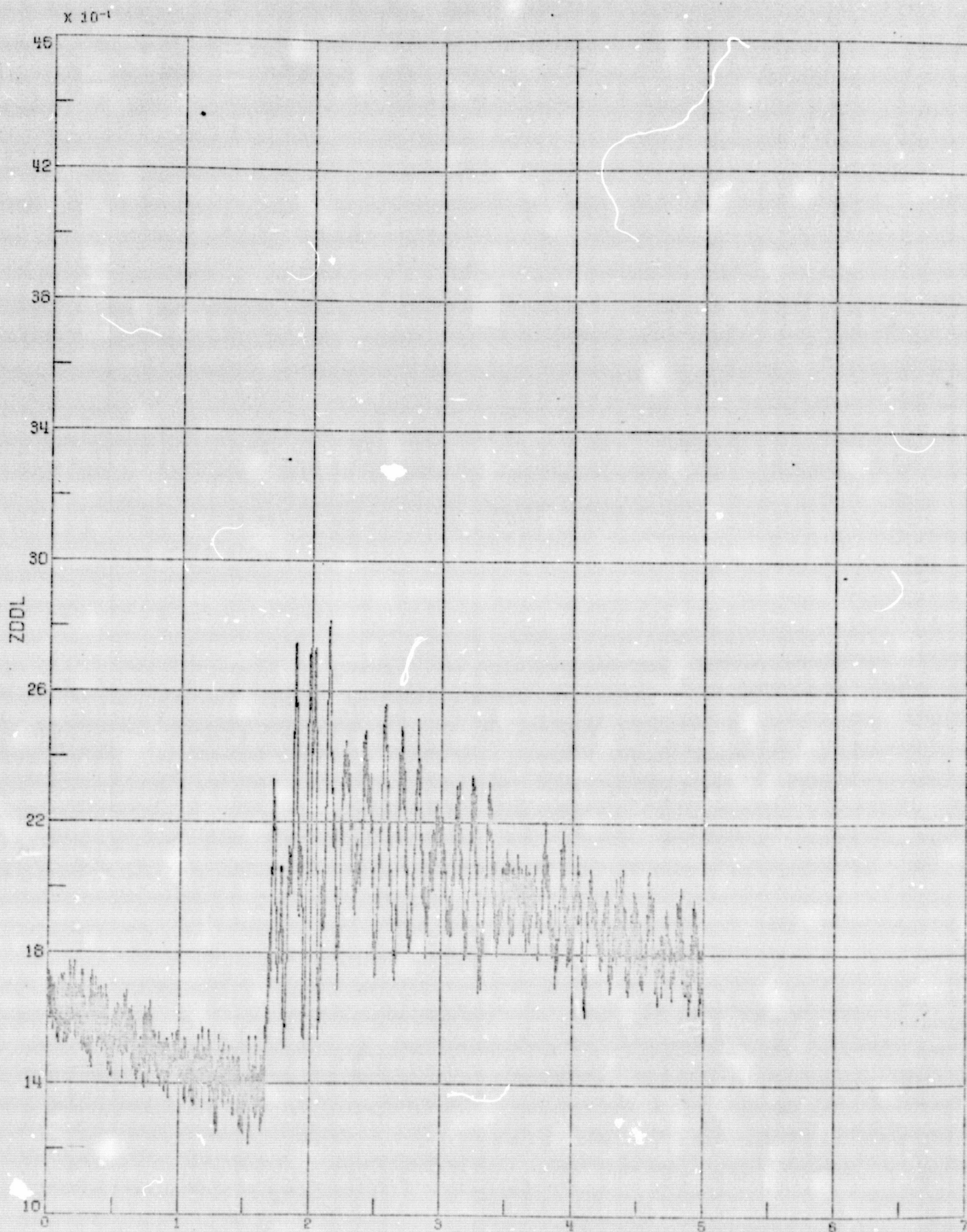
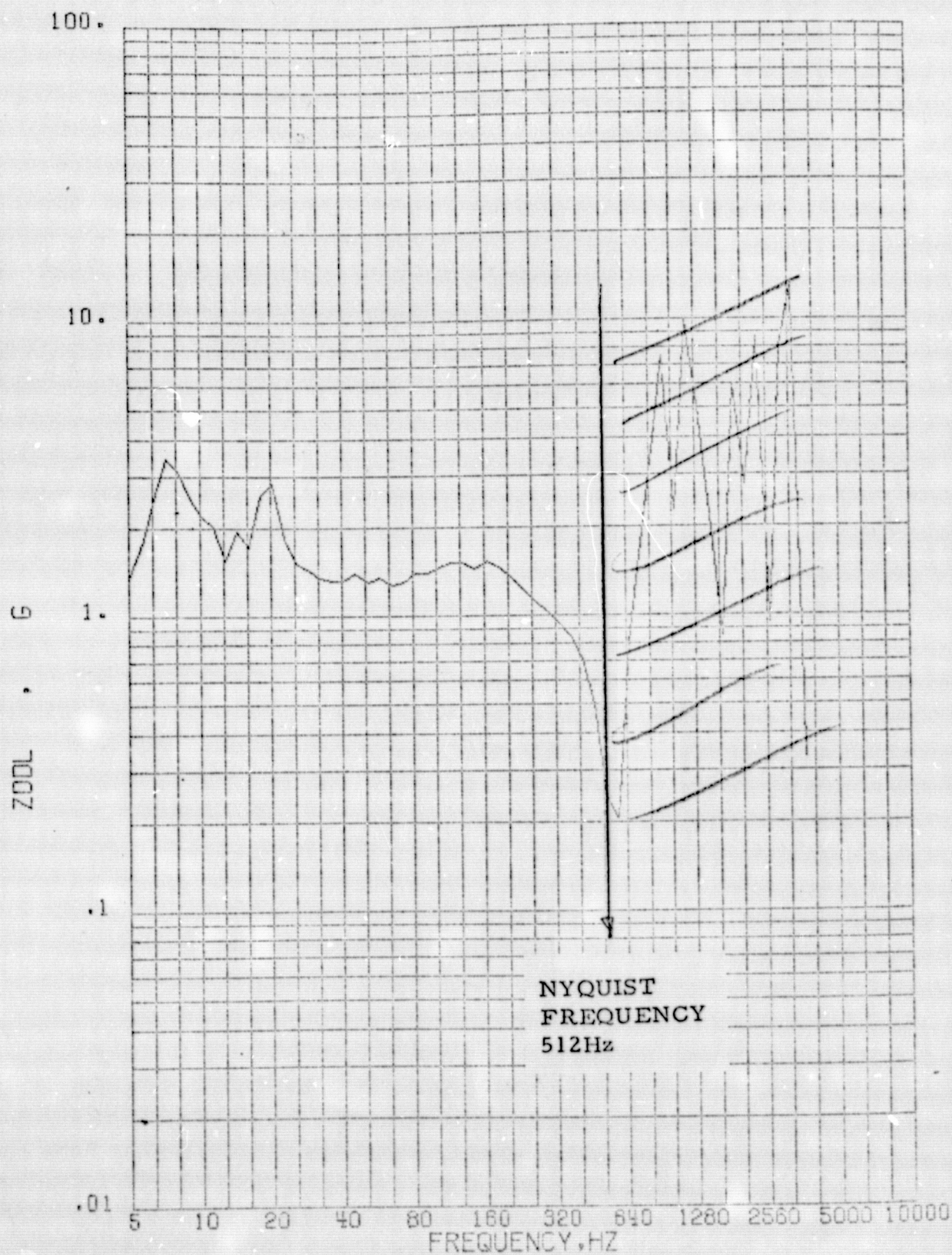


Figure 3.28a

SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

VIKING R

ST G I 1GN

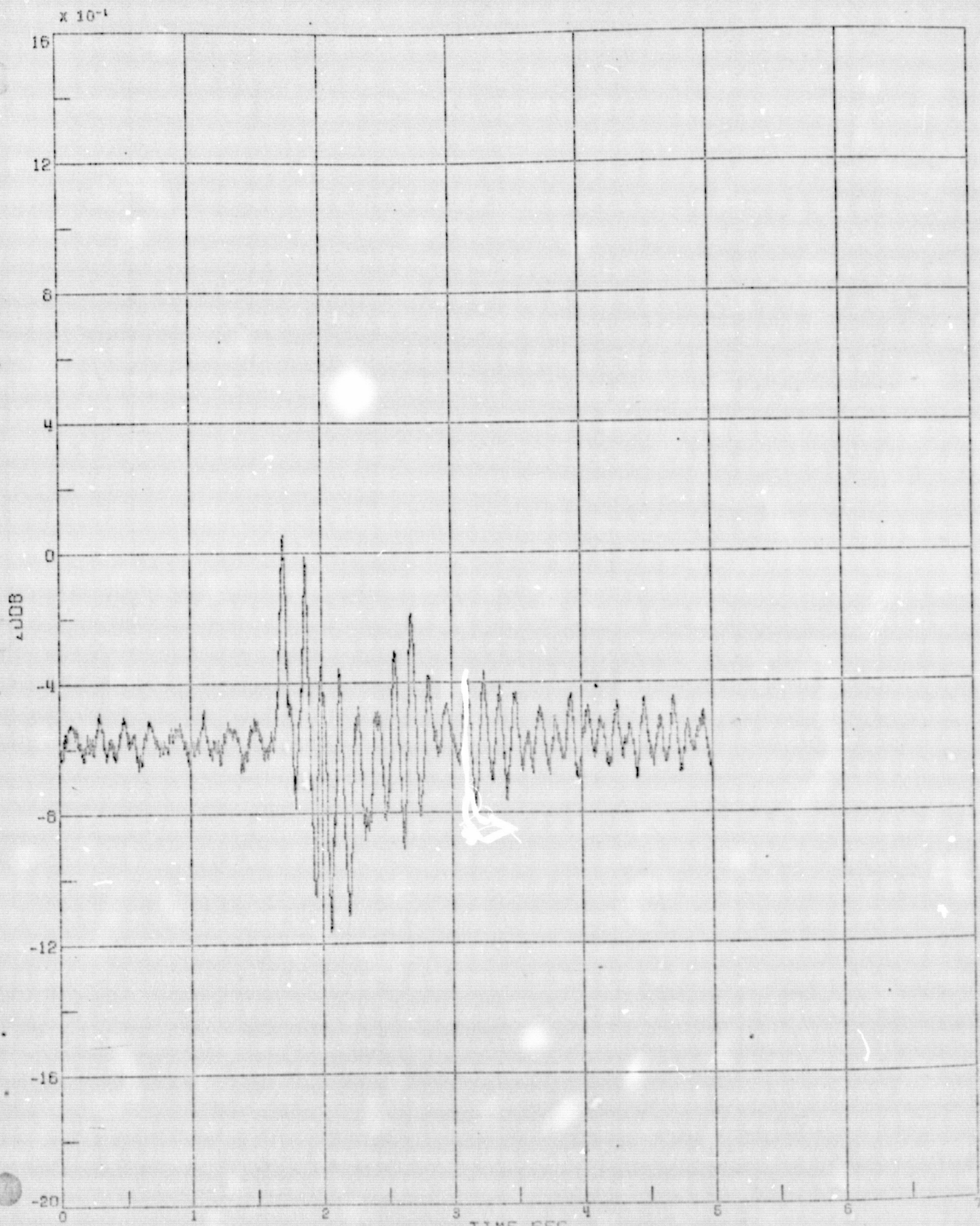
8/ ZDDL

3.59

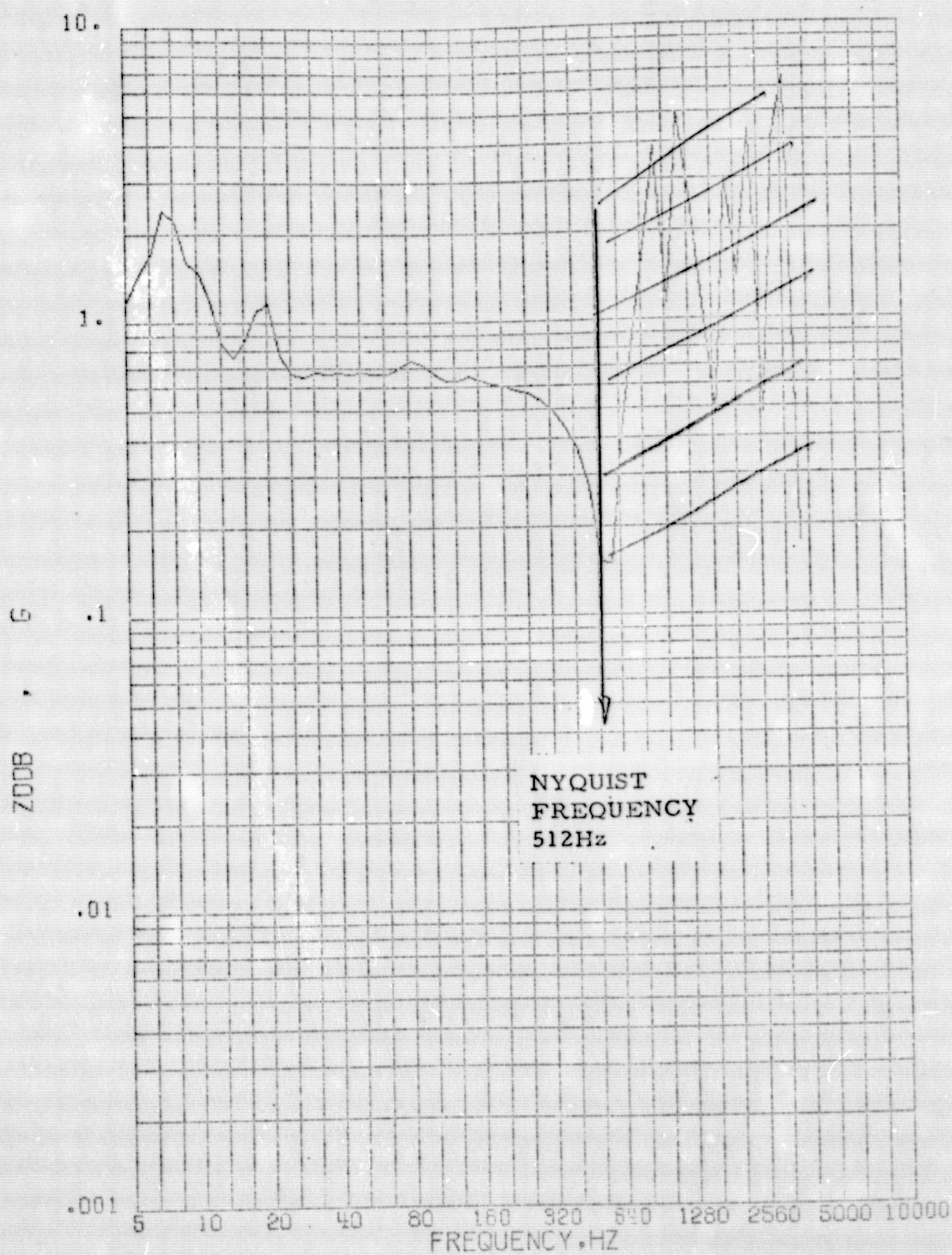
3,28 b

Figure 3.28b

long



SHOCK SPECTRUM



START=77030.0000SEC.

STOP=77034.0000SEC.

Q=10.

VIKING A

ST G I 1GN

8/ Z008

3.61

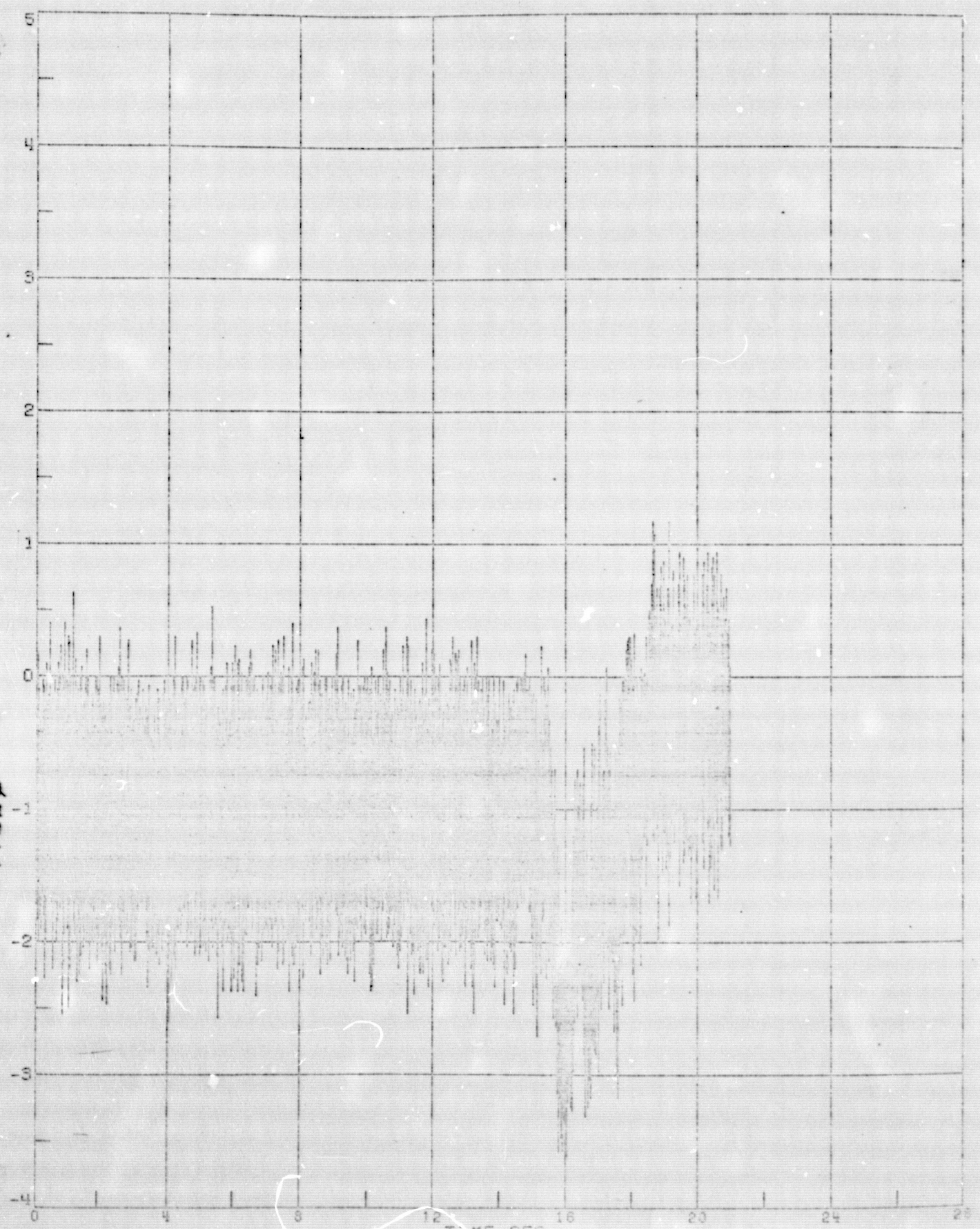
3.29 b

Figure 3.29b

long

ORIGINAL PAGE IS
OF POOR QUALITY

CY1820 ~ G

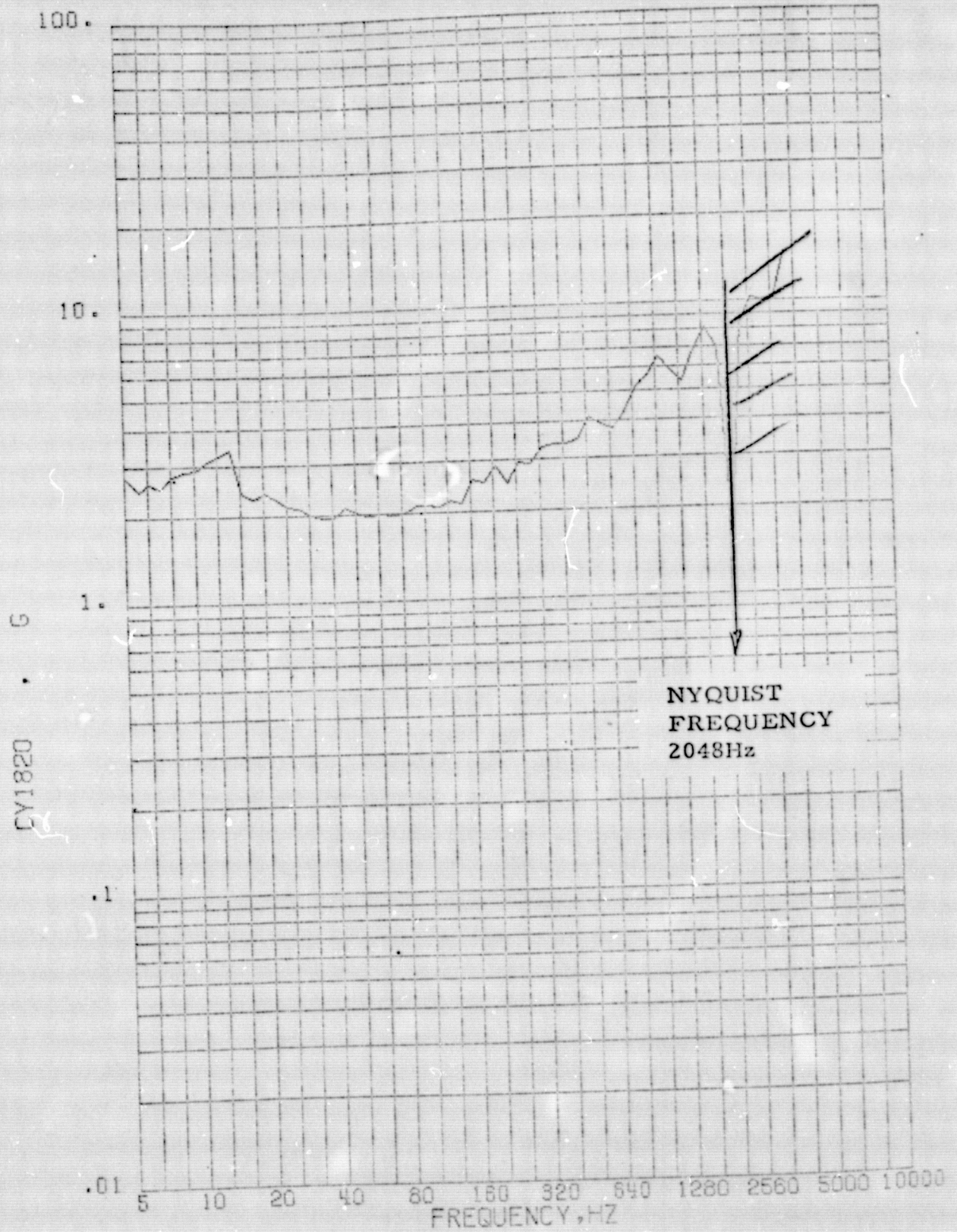


START=77178.0000SEC. TIME, SEC. STOP=77180.1000SEC.

3.309 3.62

Figure 3.30a

SHOCK SPECTRUM

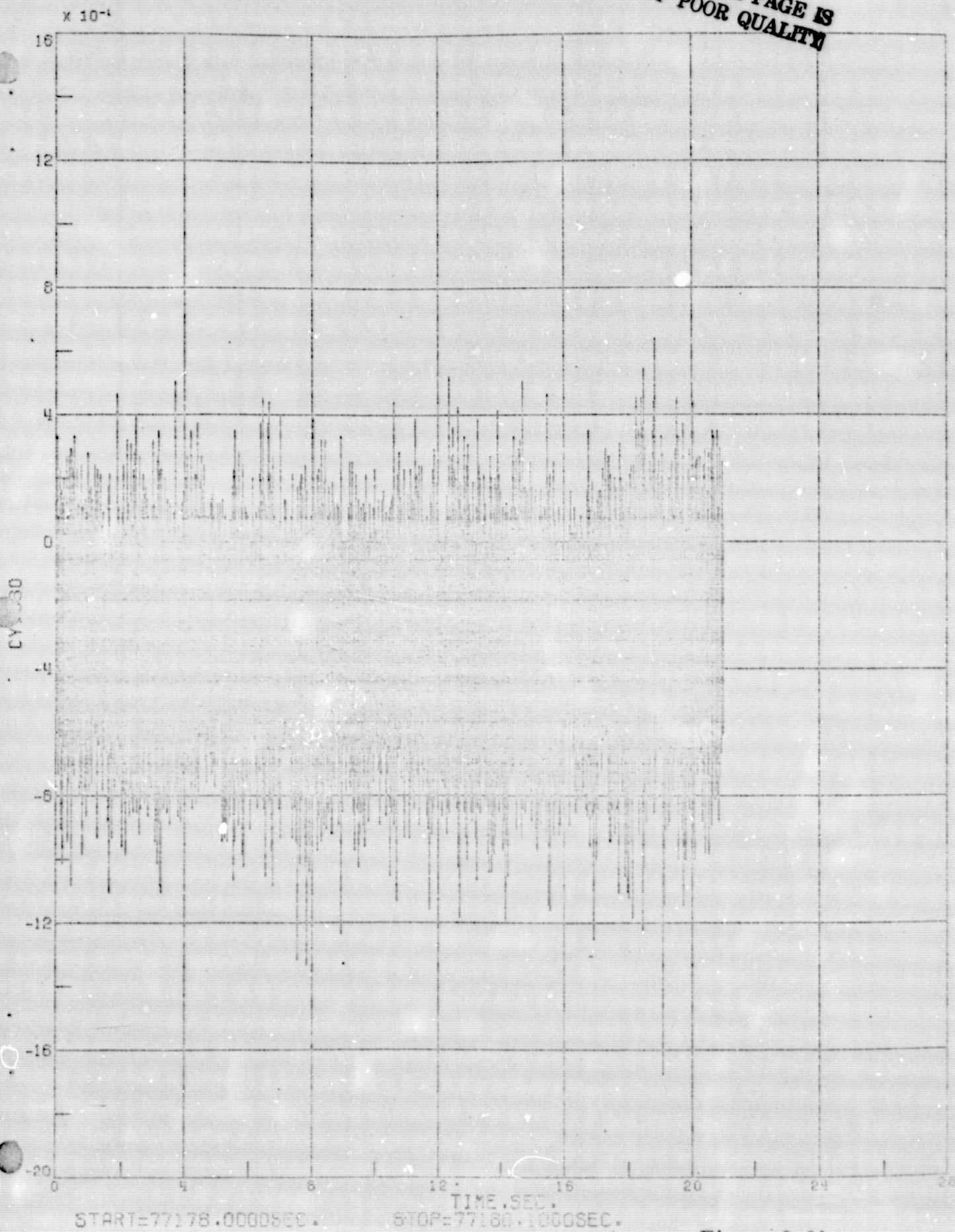


START=77179.0000SEC. STOP=77180.1000SEC. Q=10.
 VIKING A SI -80/SII-16N 8/ CY1520

3.62b

Figure 3. 30b

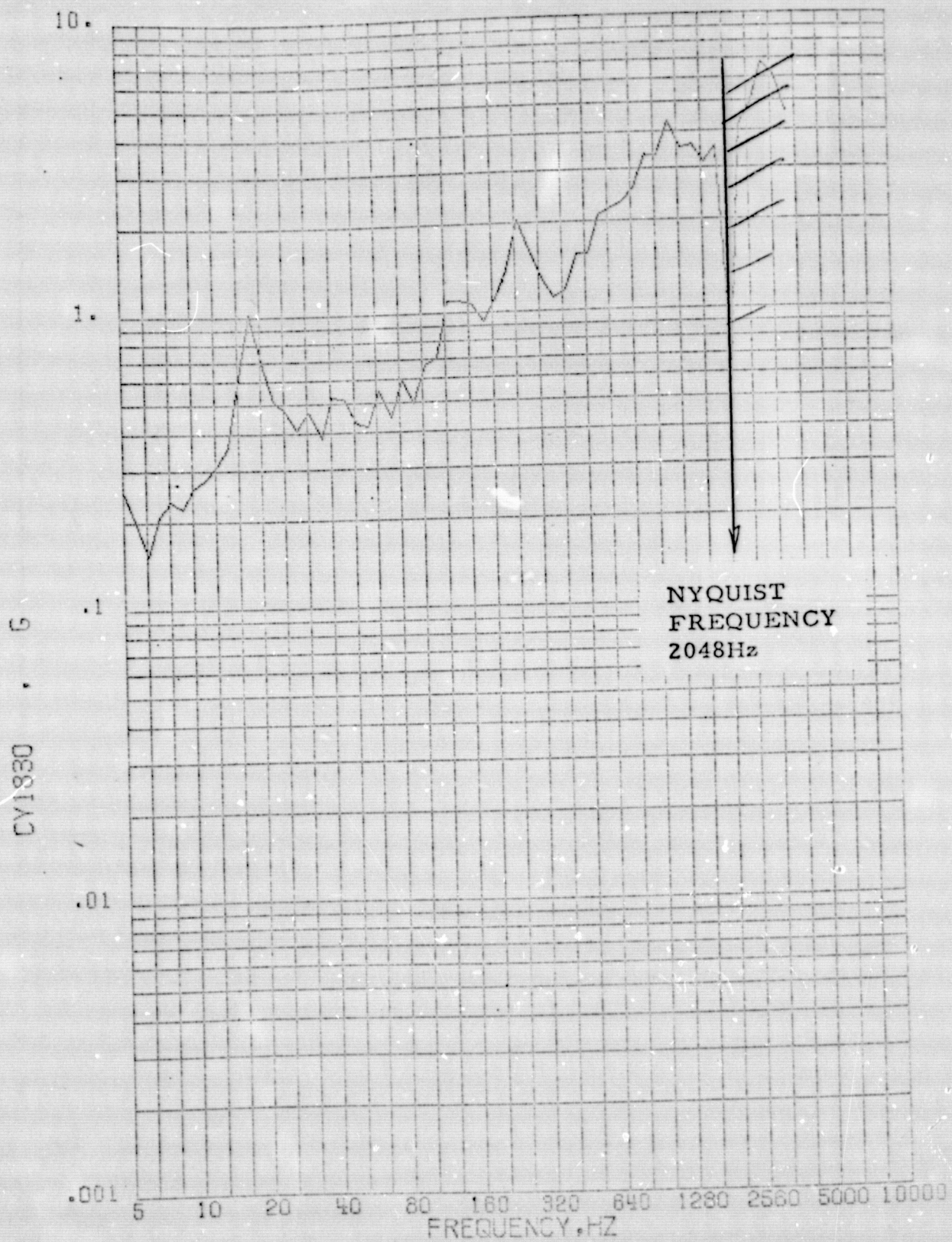
ORIGINAL PAGE IS
OF POOR QUALITY



3.639

Figure 3.31a

SHOCK SPECTRUM

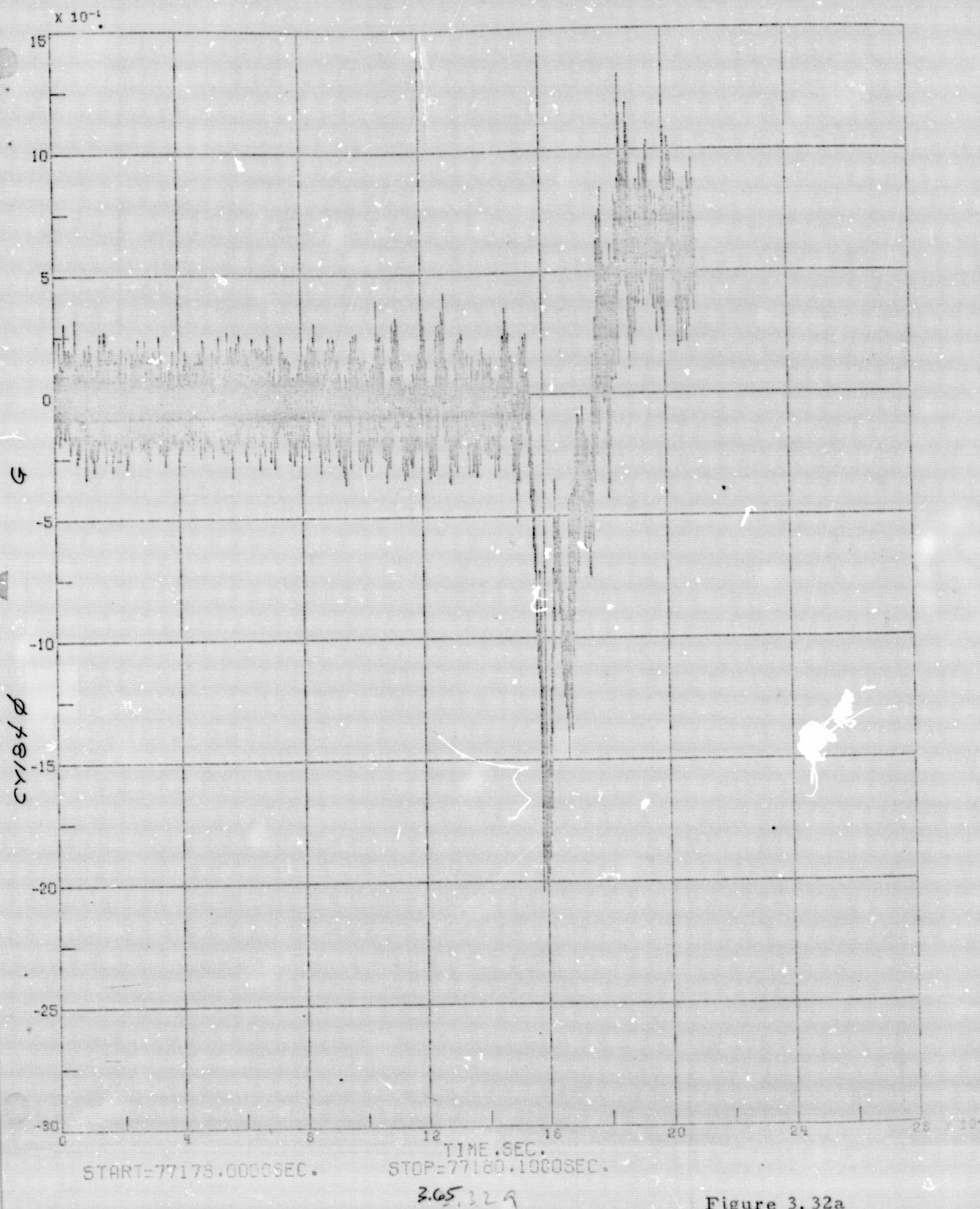


START=77179.0000SEC. STOP=77180.1000SEC. Q=10.

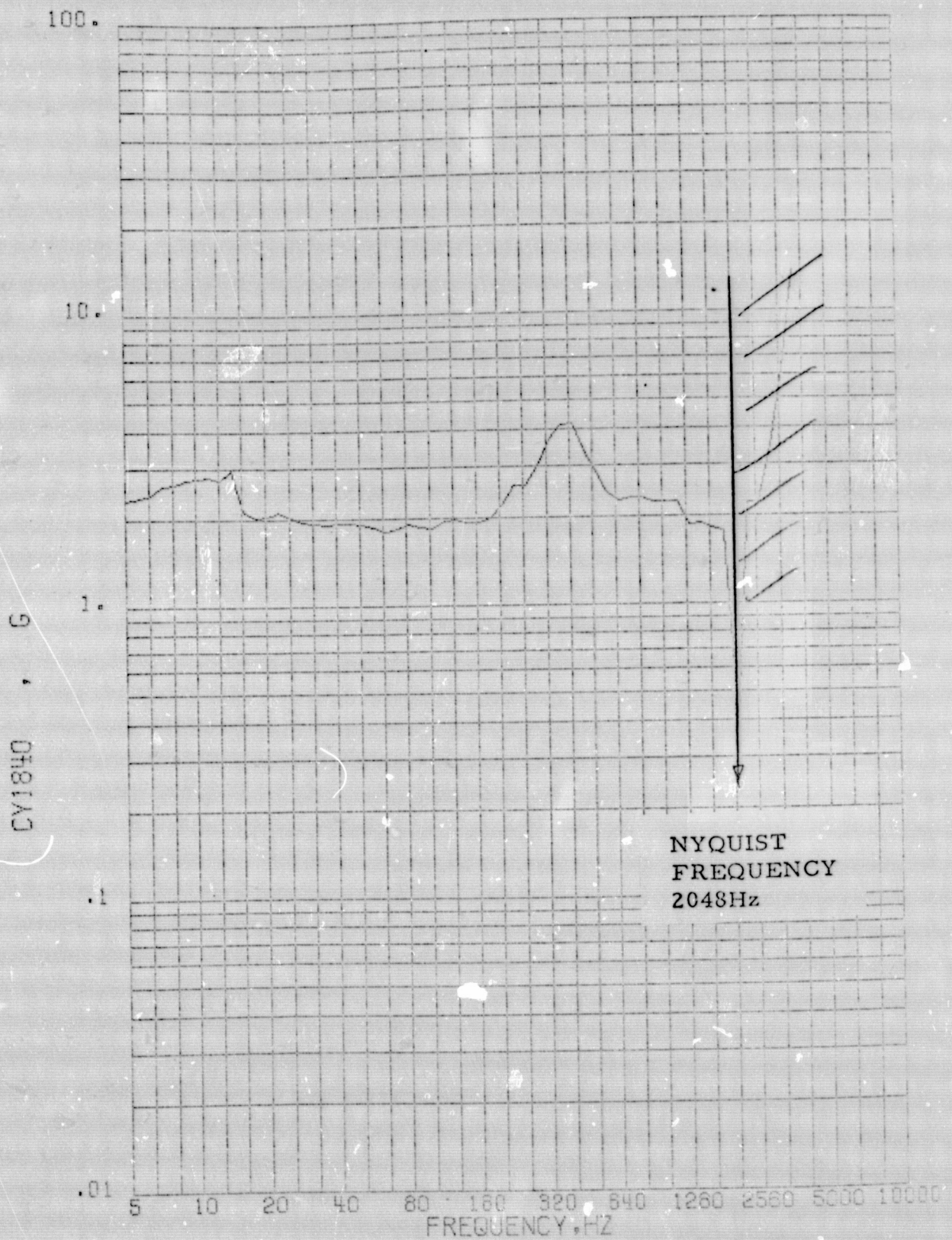
VIKING A SI-B0/SII-16N 8/ CV1830

3.64 b

Figure 3.31b



SHOCK SPECTRUM



START=77179.0000SEC. STOP=77180.1000SEC. S=10.

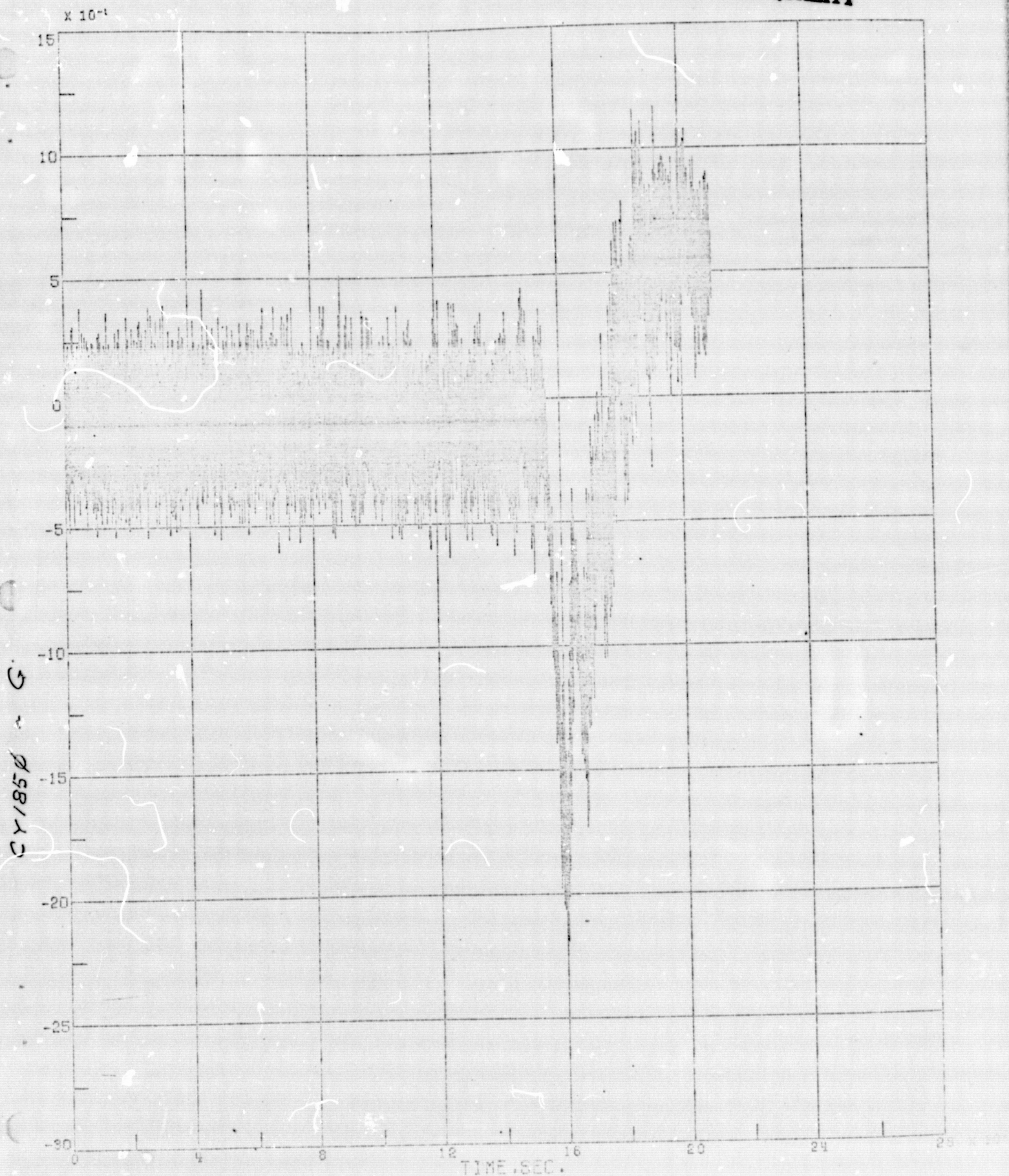
VIKING A SI -80/SII-16N

8/ CY1840

3.66 3.32b

Figure 3.32b

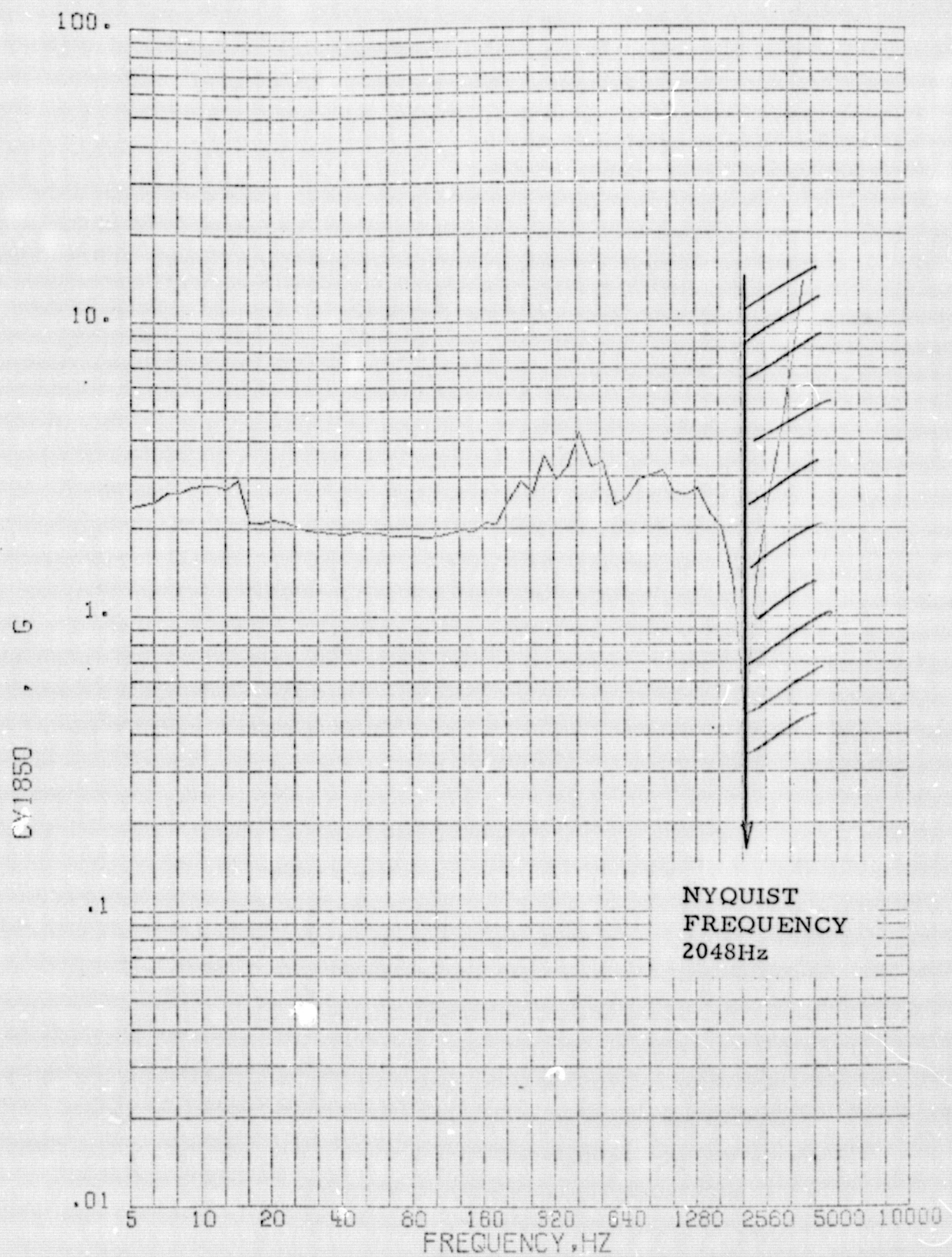
ORIGINAL PAGE IS
OF POOR QUALITY



3.67
2.339

Figure 3.33a

SHOCK SPECTRUM



START=77179.0000SEC.

STOP=77180.1000SEC.

Q=10.

VIKING A

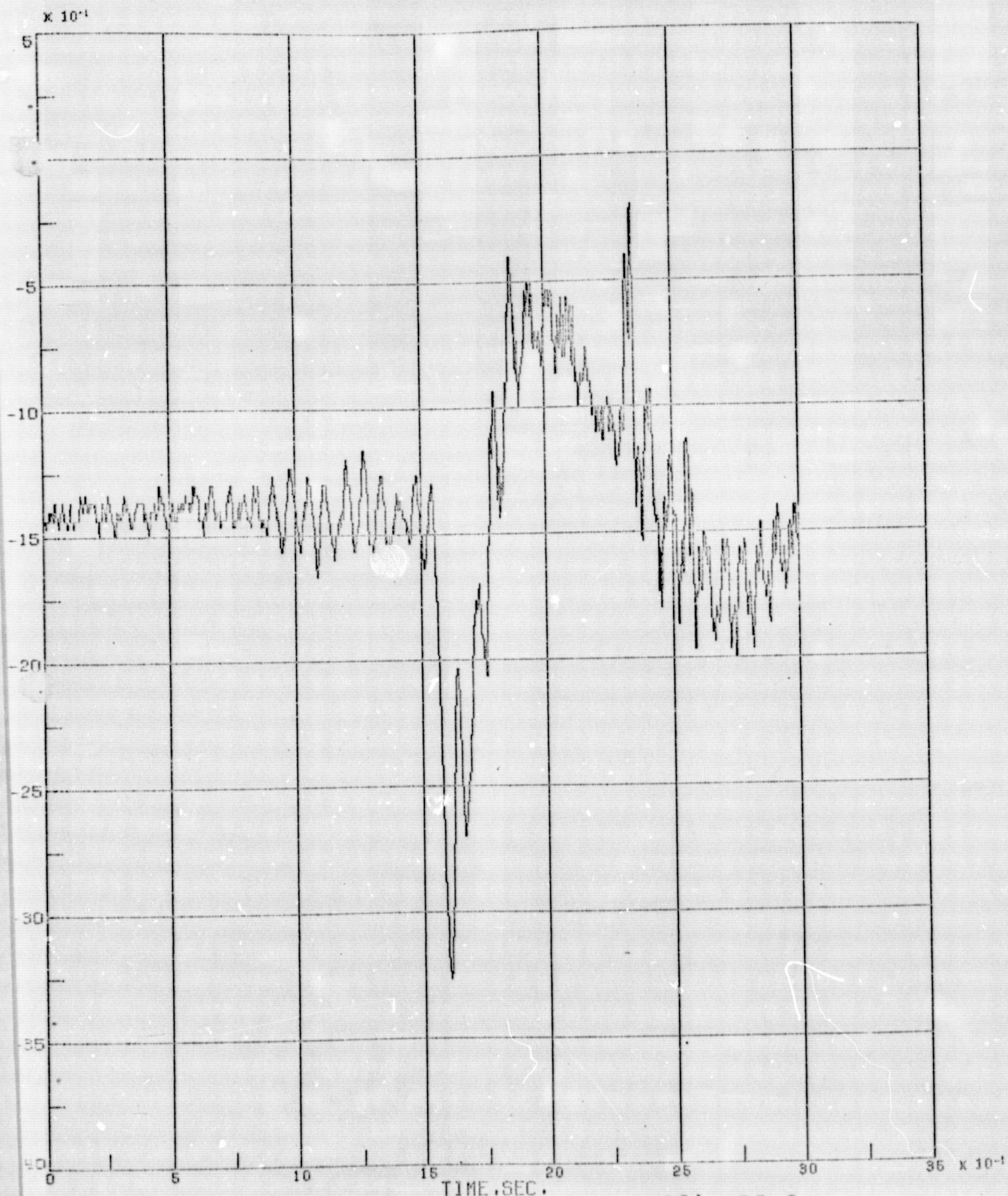
SI -80/SII-IGN

8/ CY1850

3.68

3.33 b

Figure 3.33b



START=77178.0000SEC.

STOP=77181.0000SEC.

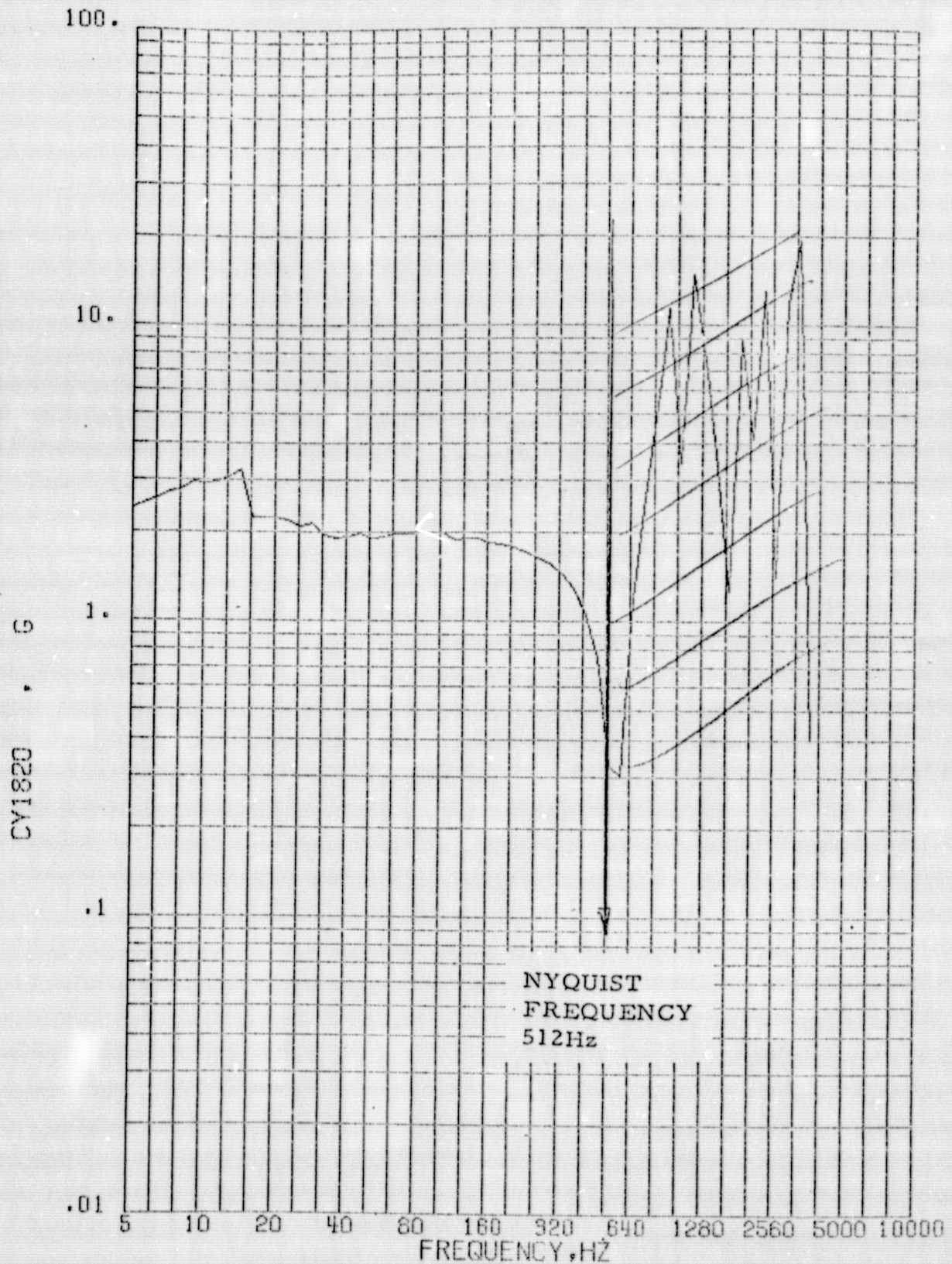
GB1 S1 80

(1024 SPS)

3.69

Figure 3.34a

SHOCK SPECTRUM



START=77178.8000SEC. STOP=77181.0000SEC. Q=10.

VIKING A GB1 ST G I 80/STG 11 IGN 8/ CY1820
(1024 SPS)

3.70 3.34 b

Figure 3.34b

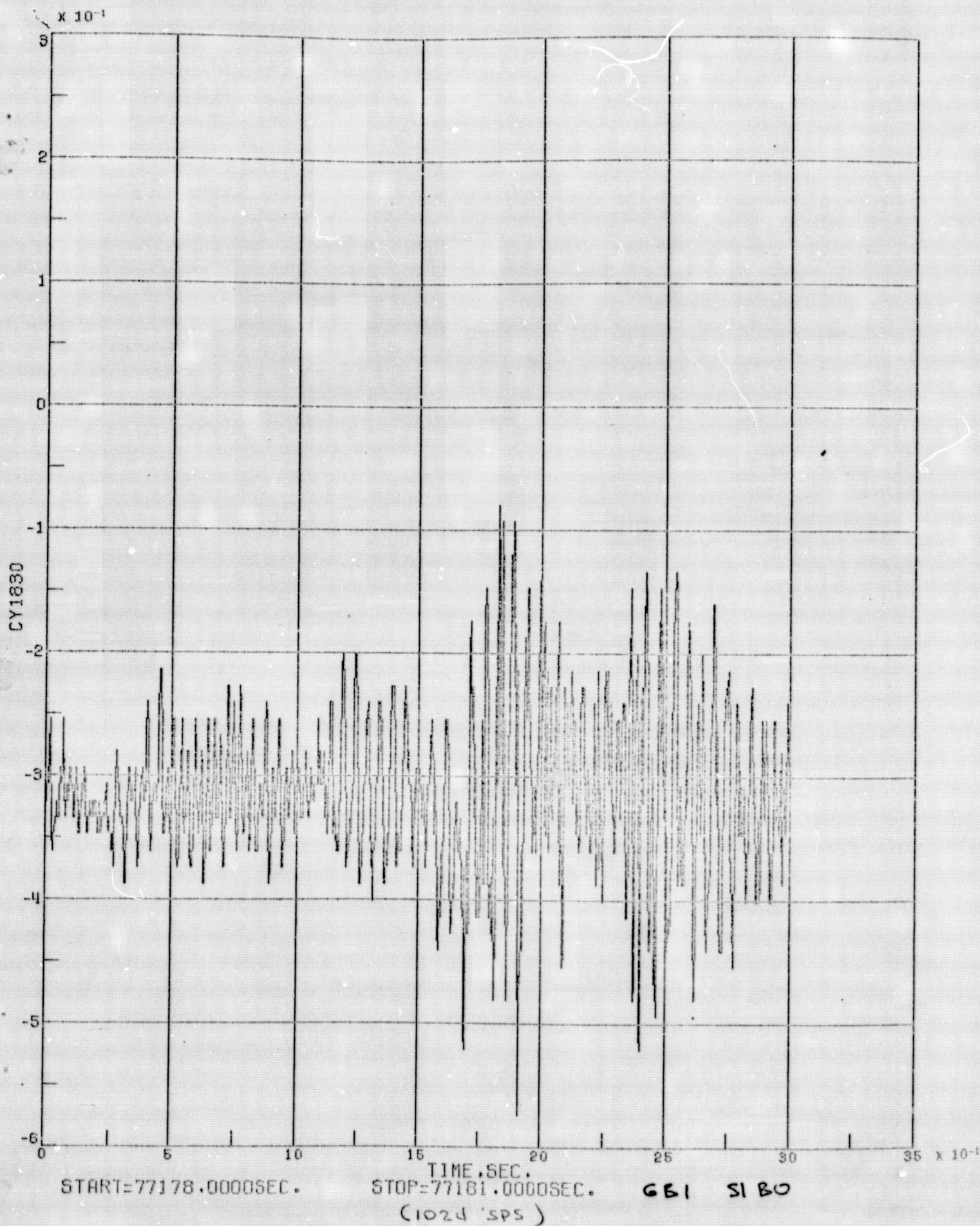
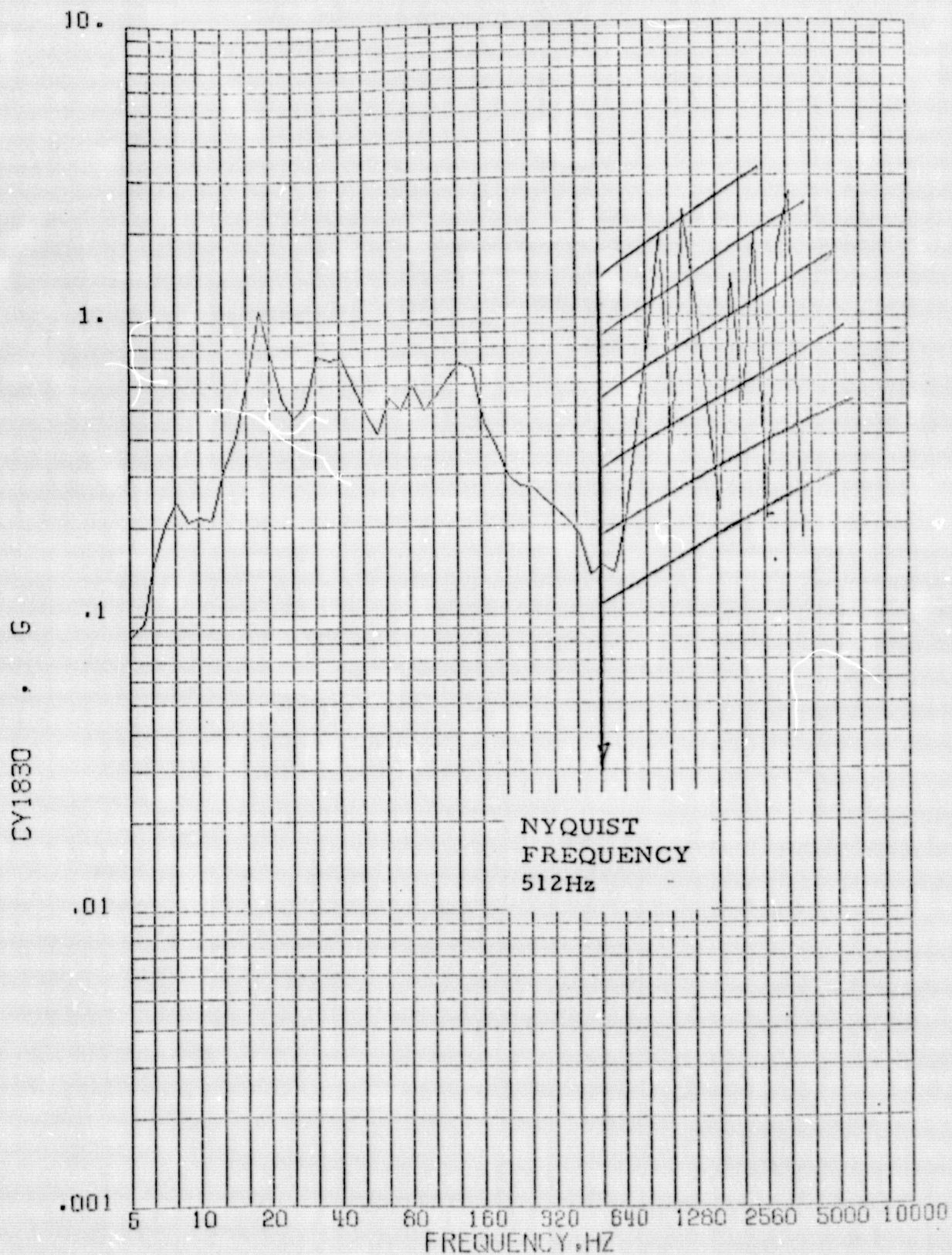


Figure 3.35a

SHOCK SPECTRUM



START=77178.8000SEC.

STOP=77181.0000SEC.

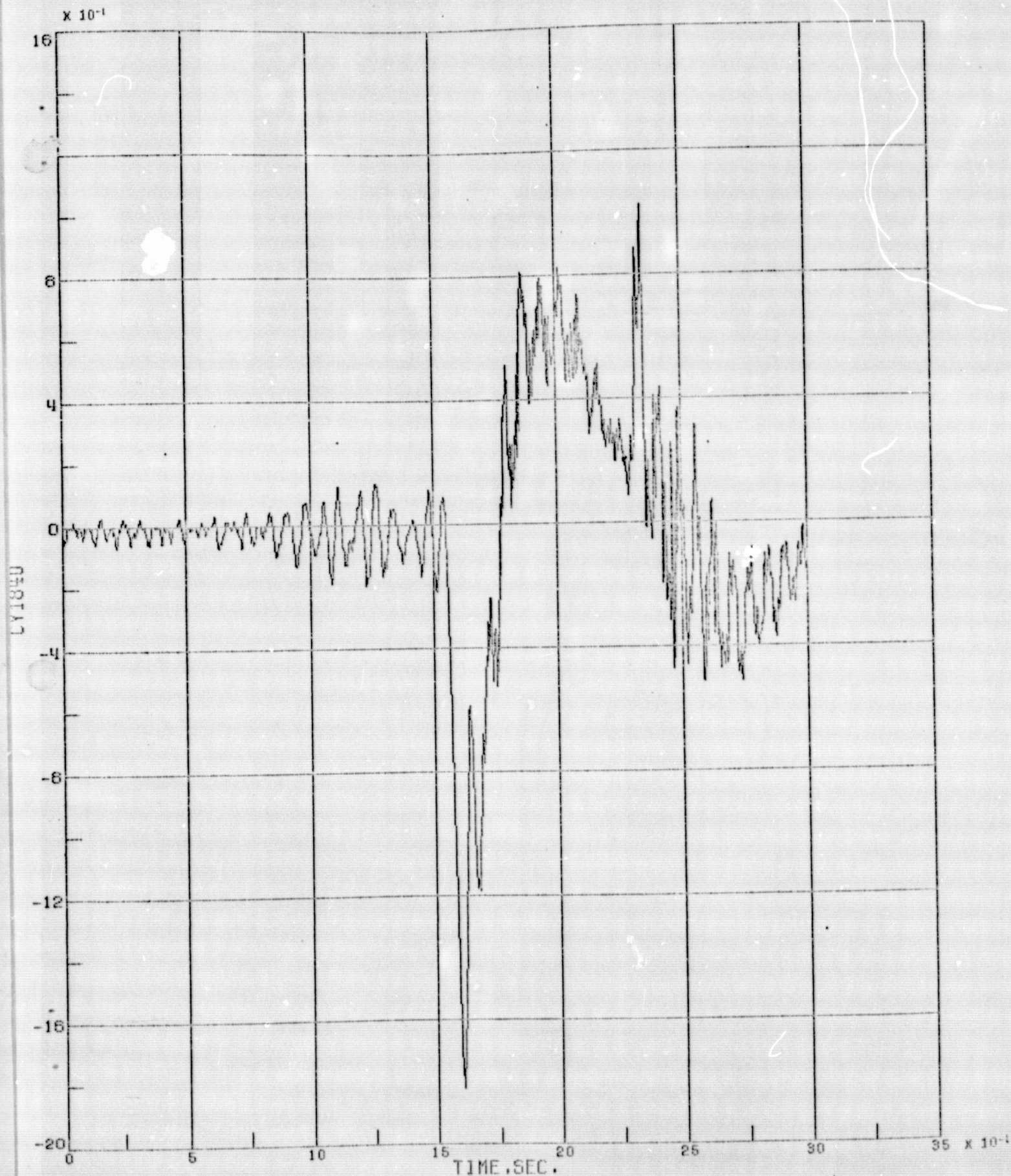
Q=10.

VIKING A 681 ST G I 80/STG II IGN
(1024 SPS)

8/ CY1830

3.72 3.35 b

Figure 3.35b



START=77178.0000SEC.

STOP=77181.0000SEC.

5180

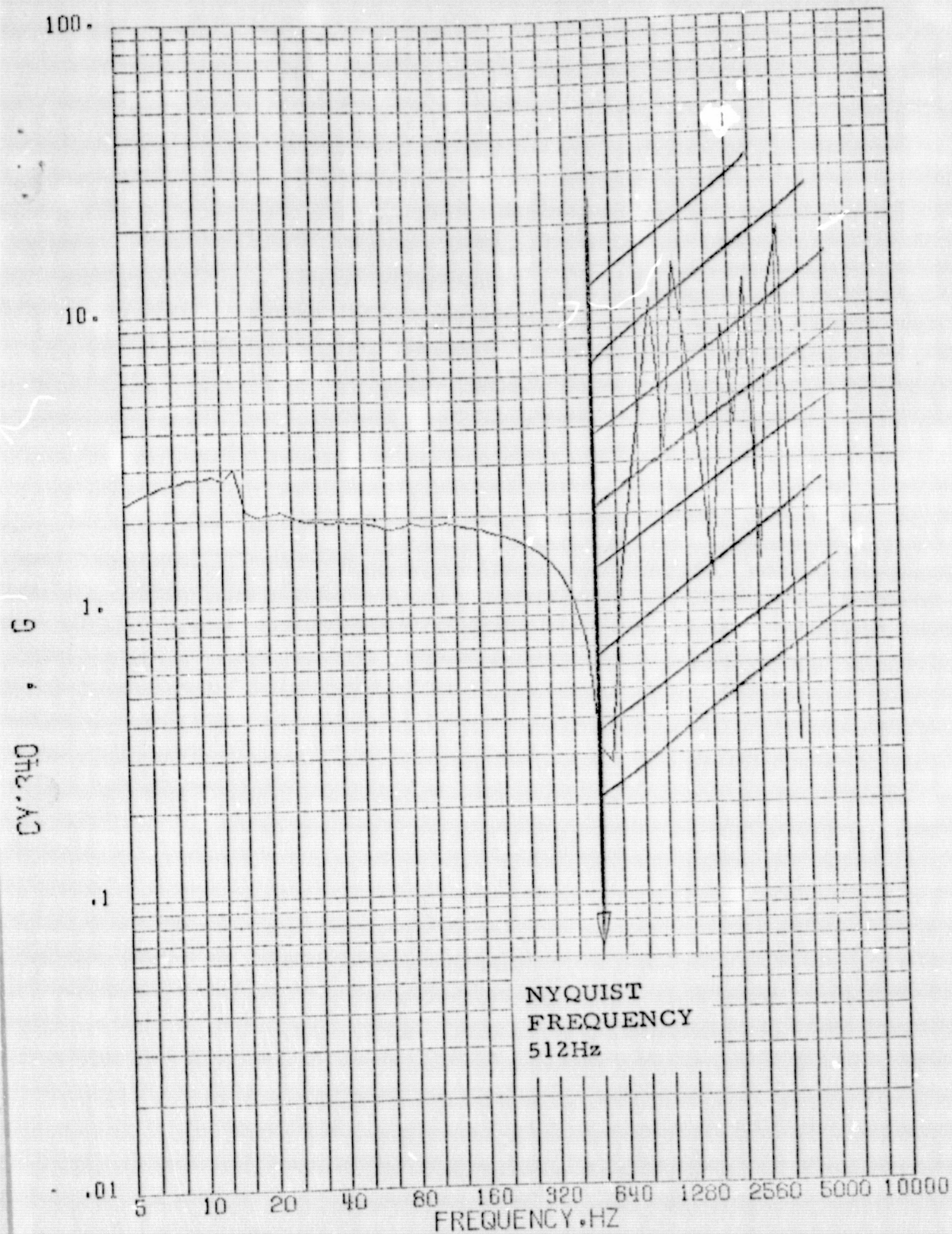
GB1

(1024 SPS)

3.73 3.369

Figure 3.36a

SHOCK SPECTRUM



START=77178.8000SEC.

STOP=77181.0000SEC.

Q=10.

VIKING A GB1 ST G 1 BO/STG II IGN
(1024 SPS)

8/ CY1840

Figure 3.36b

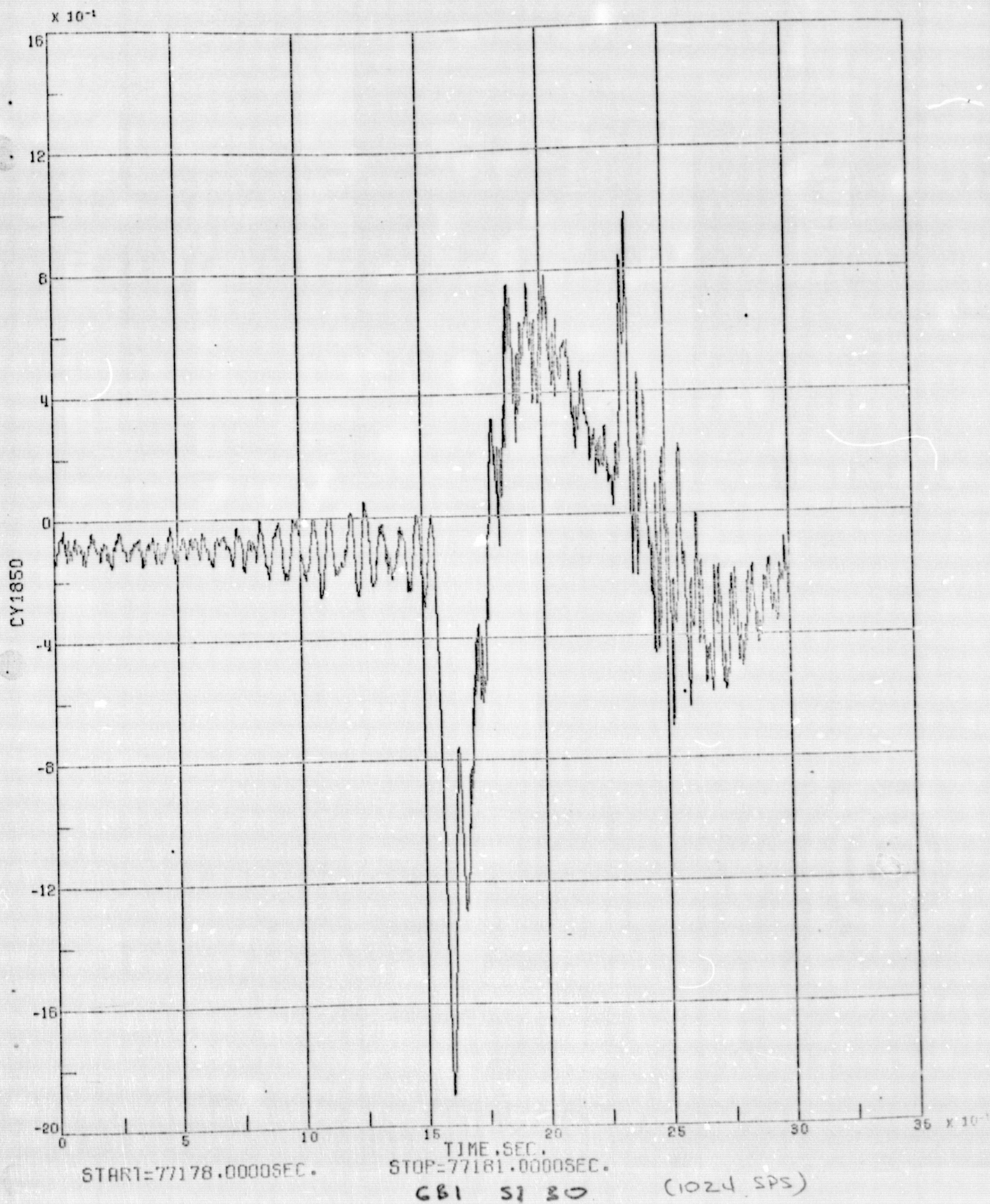
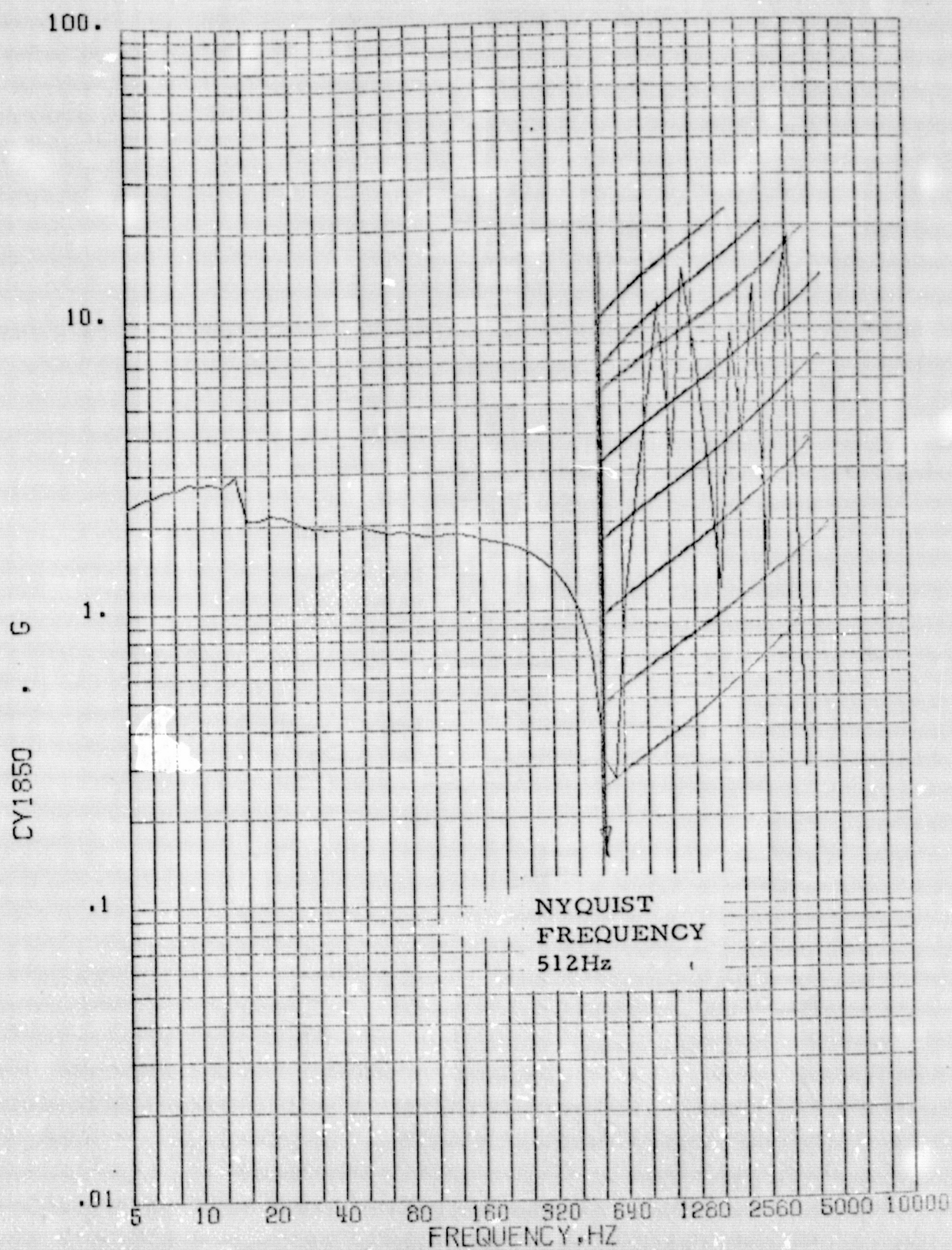


Figure 3.37a

SHOCK SPECTRUM



START=77178.8000SEC.

STOP=77181.0000SEC.

Q=10.

VIKING R

ST G I 80/STG II IGN

8/ CY1850

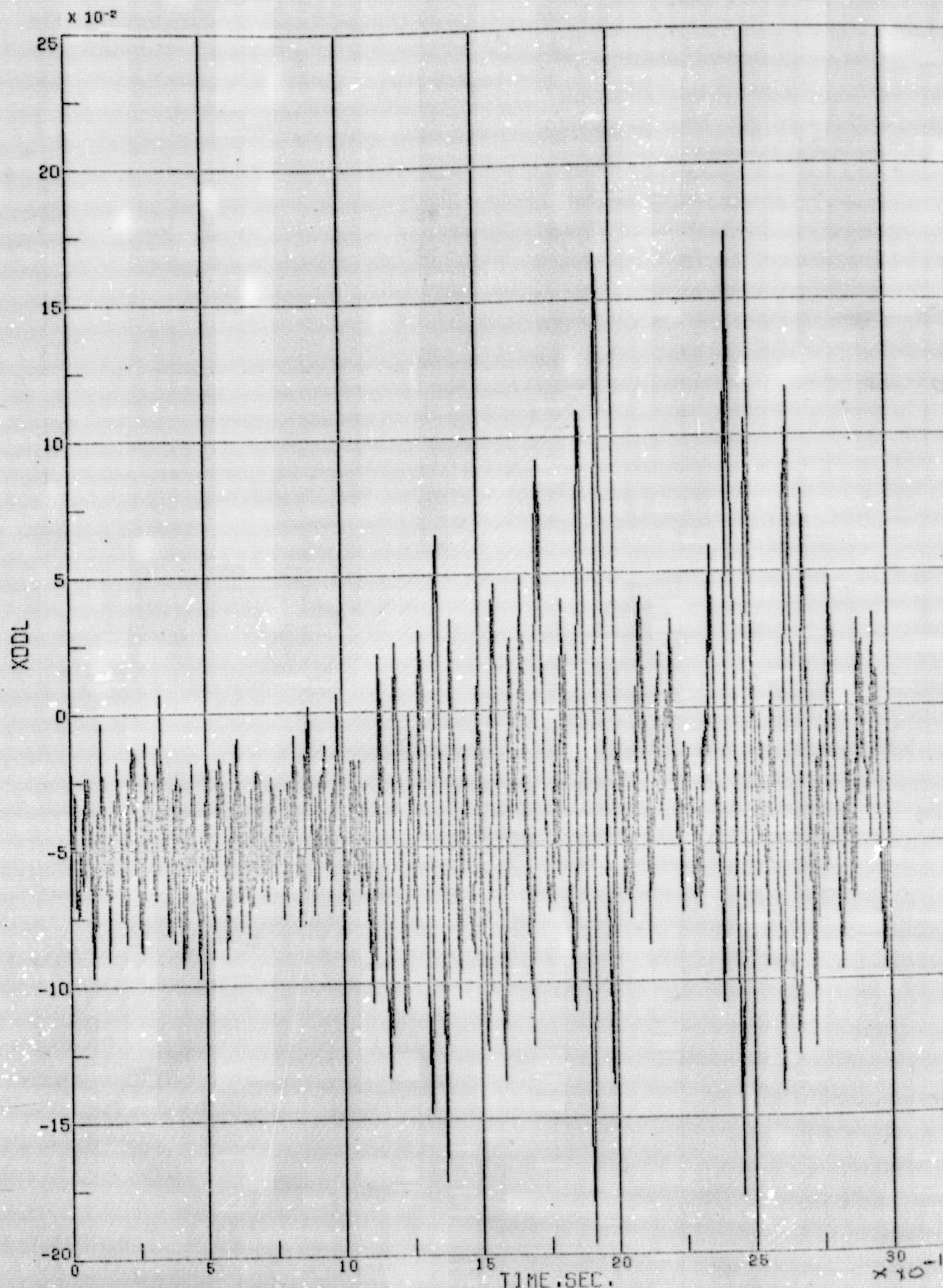
GBI

(1024 SPS)

3.76

3.37 b

Figure 3.37b



START=77178.0000SEC.

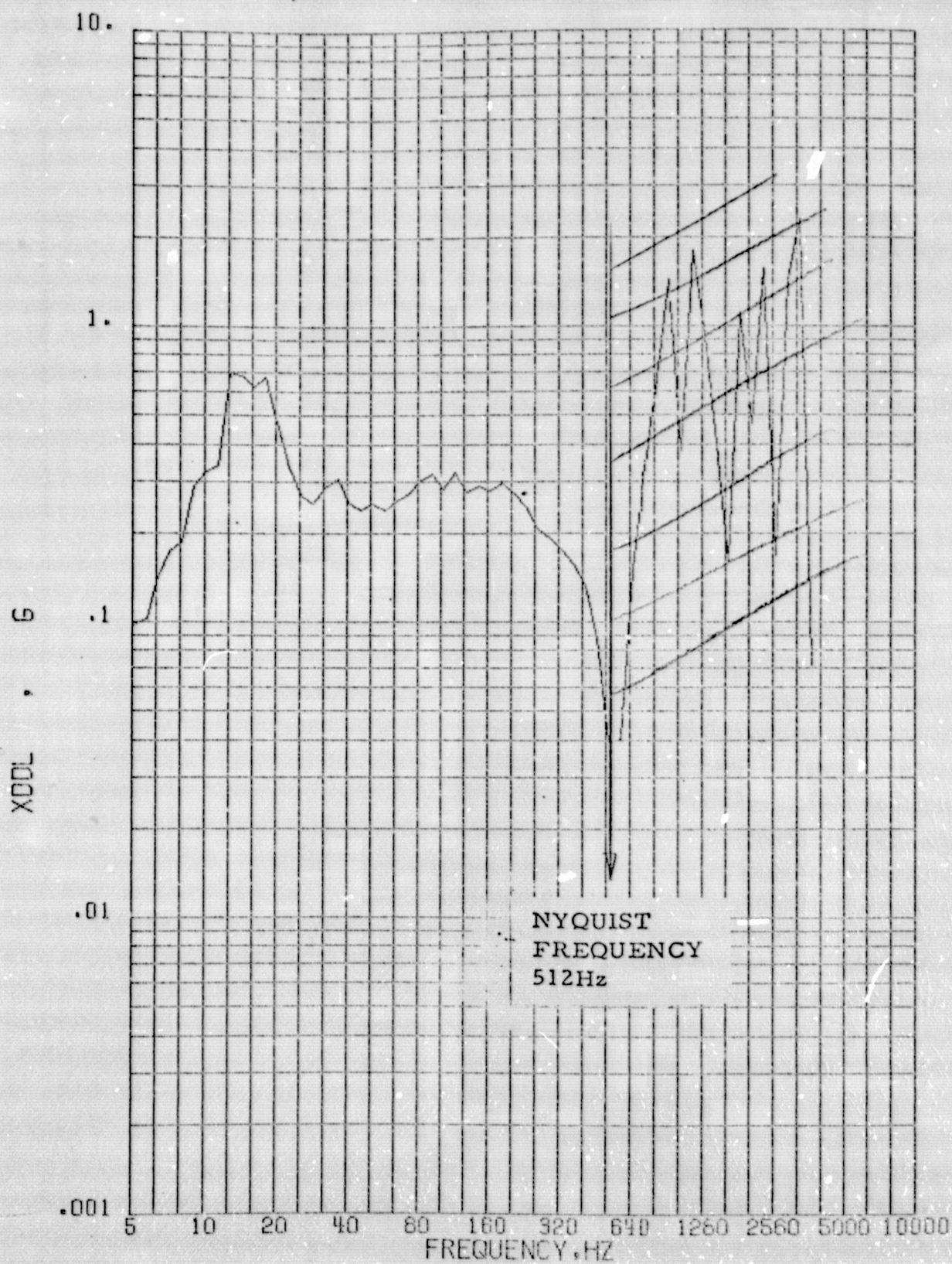
STOP=77181.0000SEC.

GBI
3.77

(1024 SPS)

Figure 3.38a

SHOCK SPECTRUM



START=77176.8000SEC.

STOP=77181.0000SEC.

Q=10.

VIKING A

681

ST 6 1 80/STG 11 1GN

8/

XDDL

(1024 SPS)

1024

3.78

3.38 b

Figure 3.38b

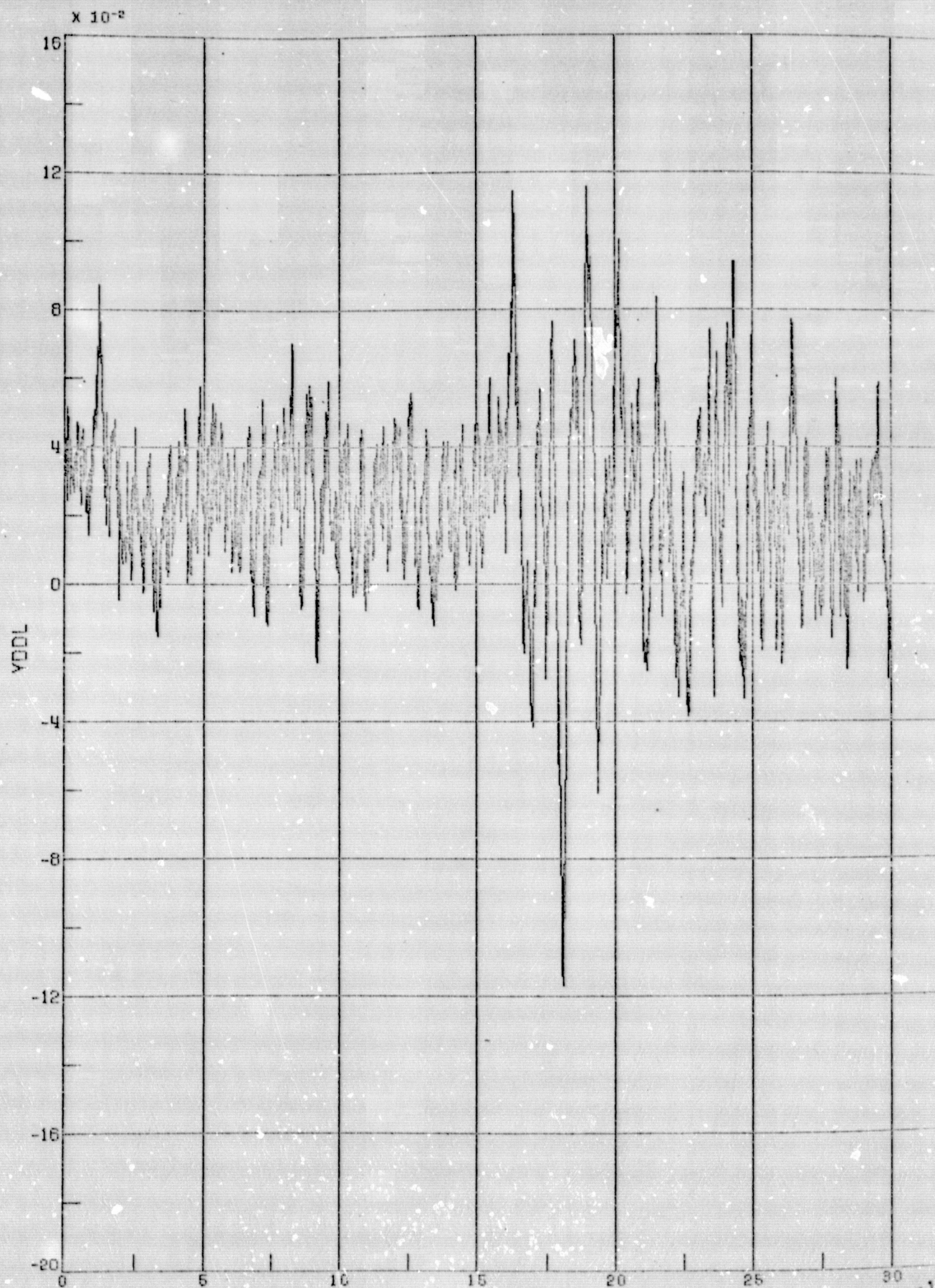
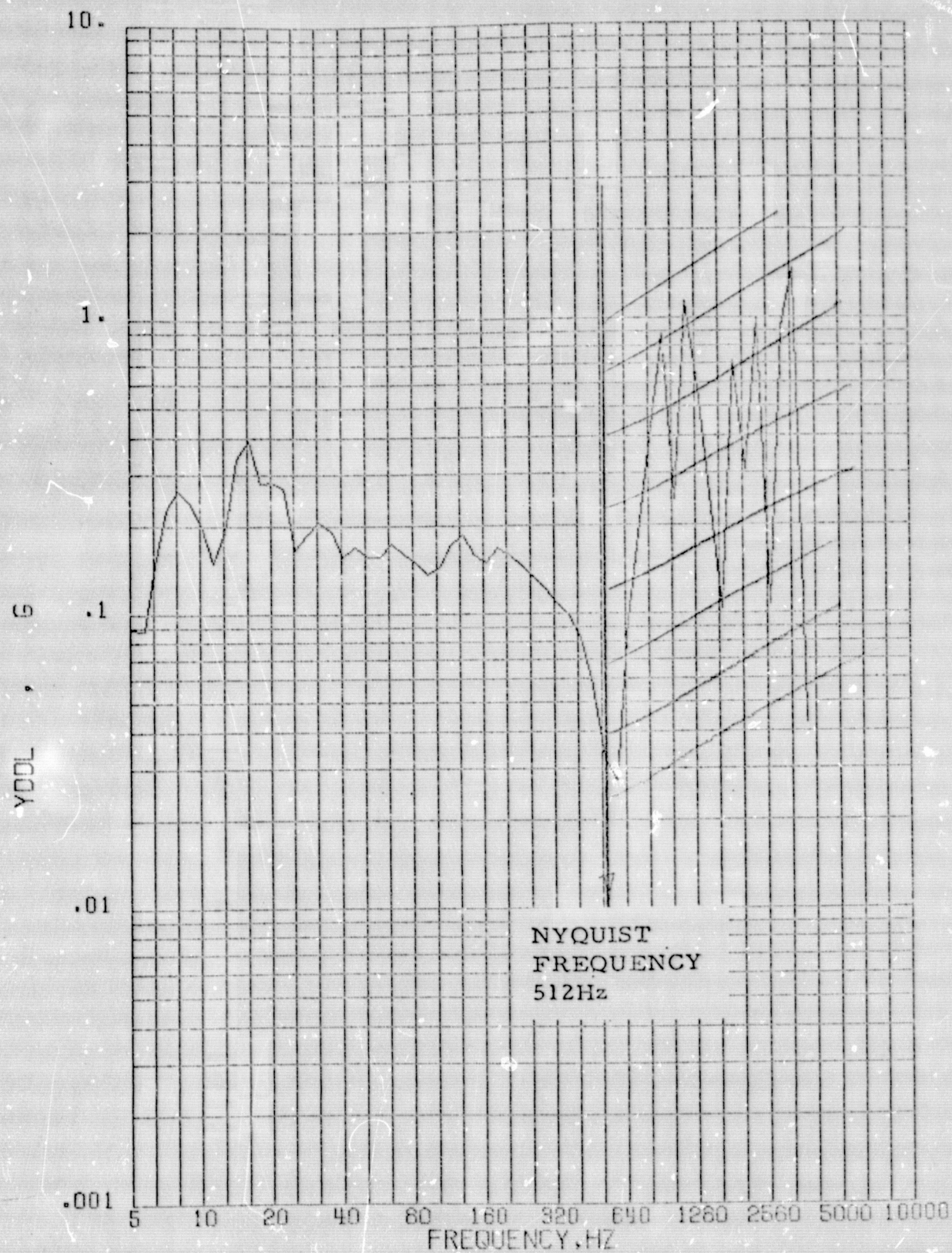


Figure 3.39a

SHOCK SPECTRUM



START=77178.8000SEC.

STOP=77181.0000SEC.

Q=10.

VIKING A

GB1

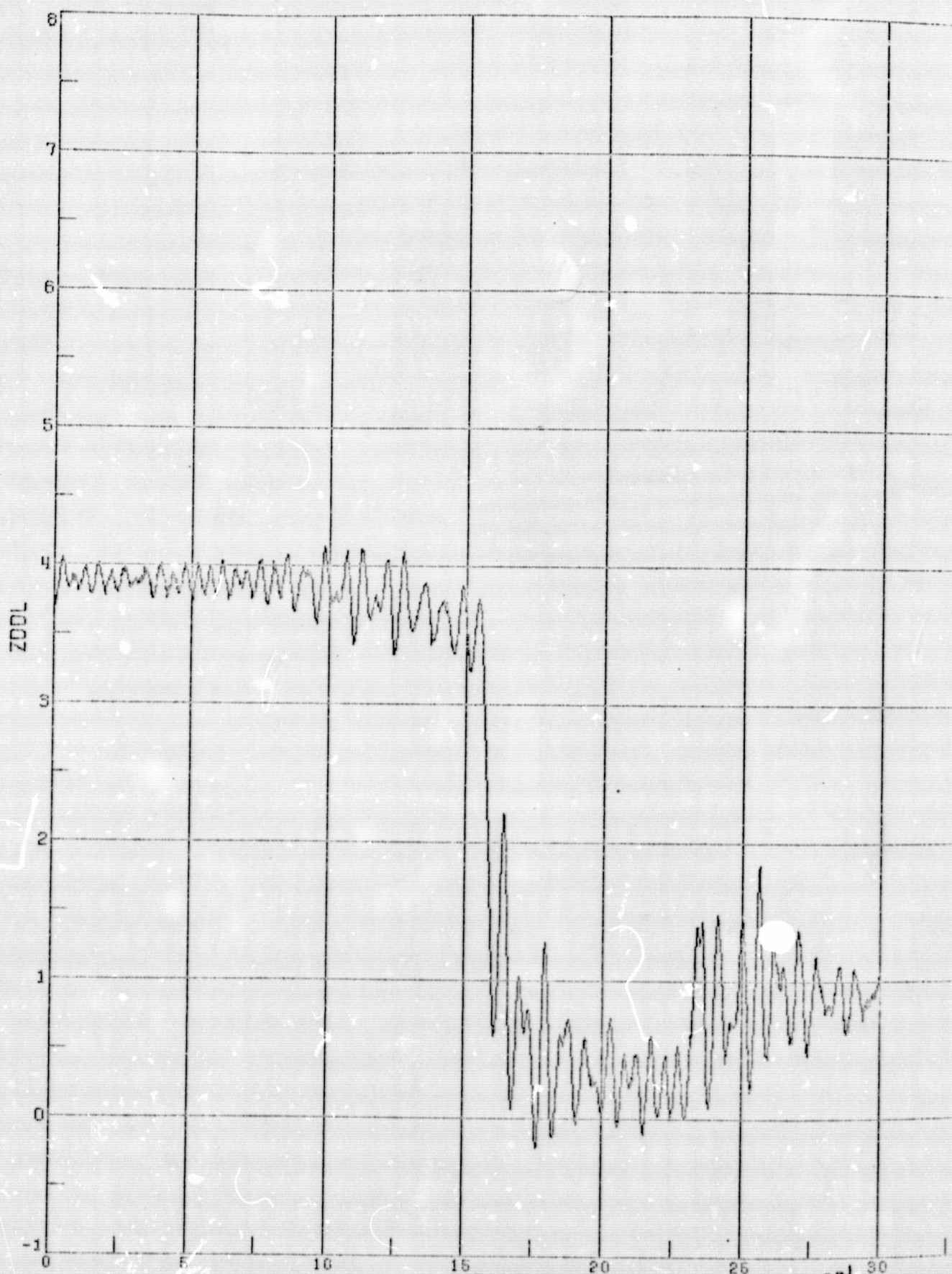
ST 6 I 80/ST6 II 16N
(1024 SPS)

8/

YDDL

3.80

Figure 3.39b



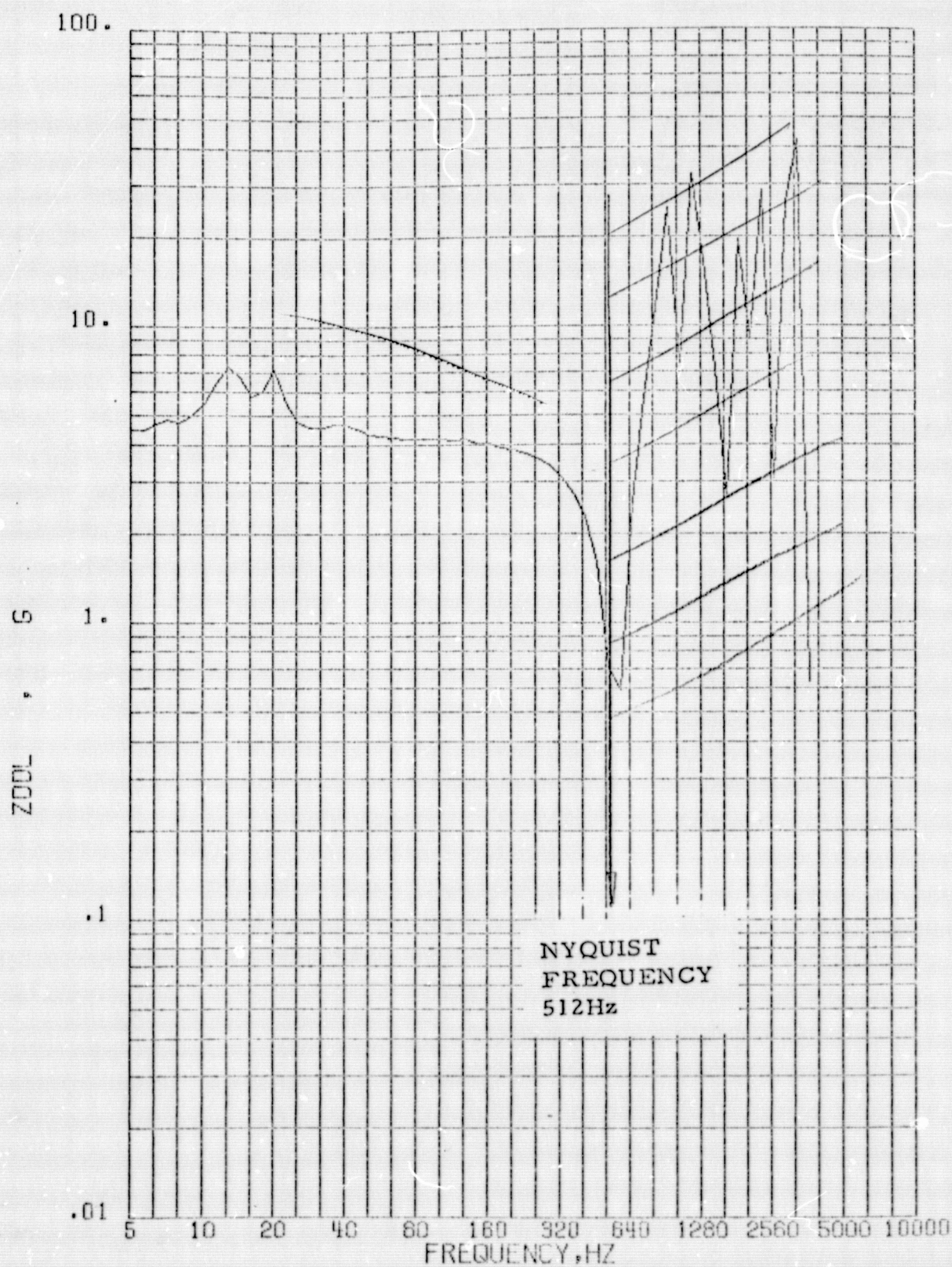
START=77178.0000SEC.

STOP=77181.0000SEC.

651 (1024 SPS)
3.81 2.40 9

Figure 3.40a

SHOCK SPECTRUM

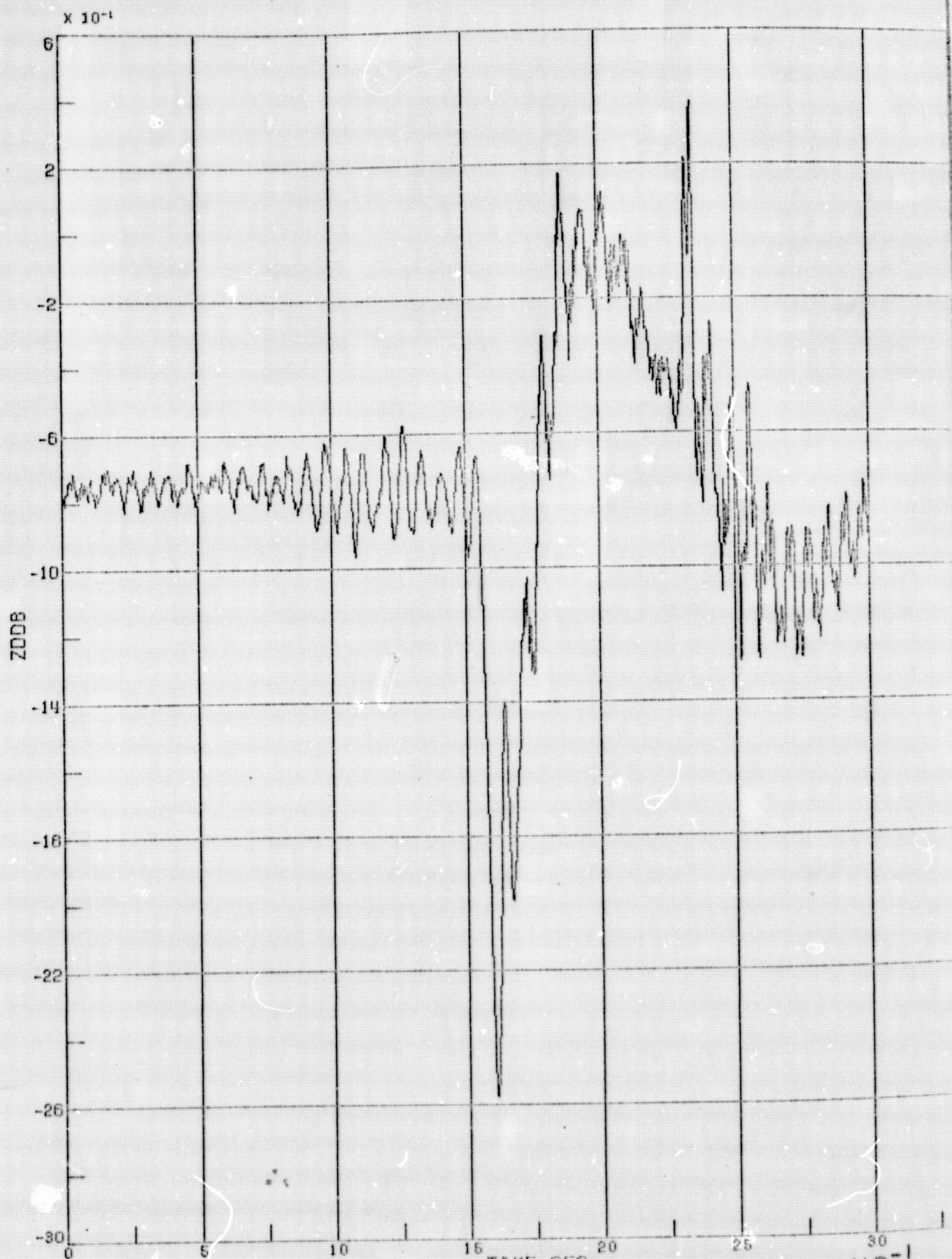


START=77178.8000SEC. STOP=77181.0000SEC. Q=10.

VIKING A GB1 ST G I 80/STG II IGN 8/ ZDDL
(1024 SPS)

3.02
3.40b

Figure 3.40b



START=77178.0000SEC.

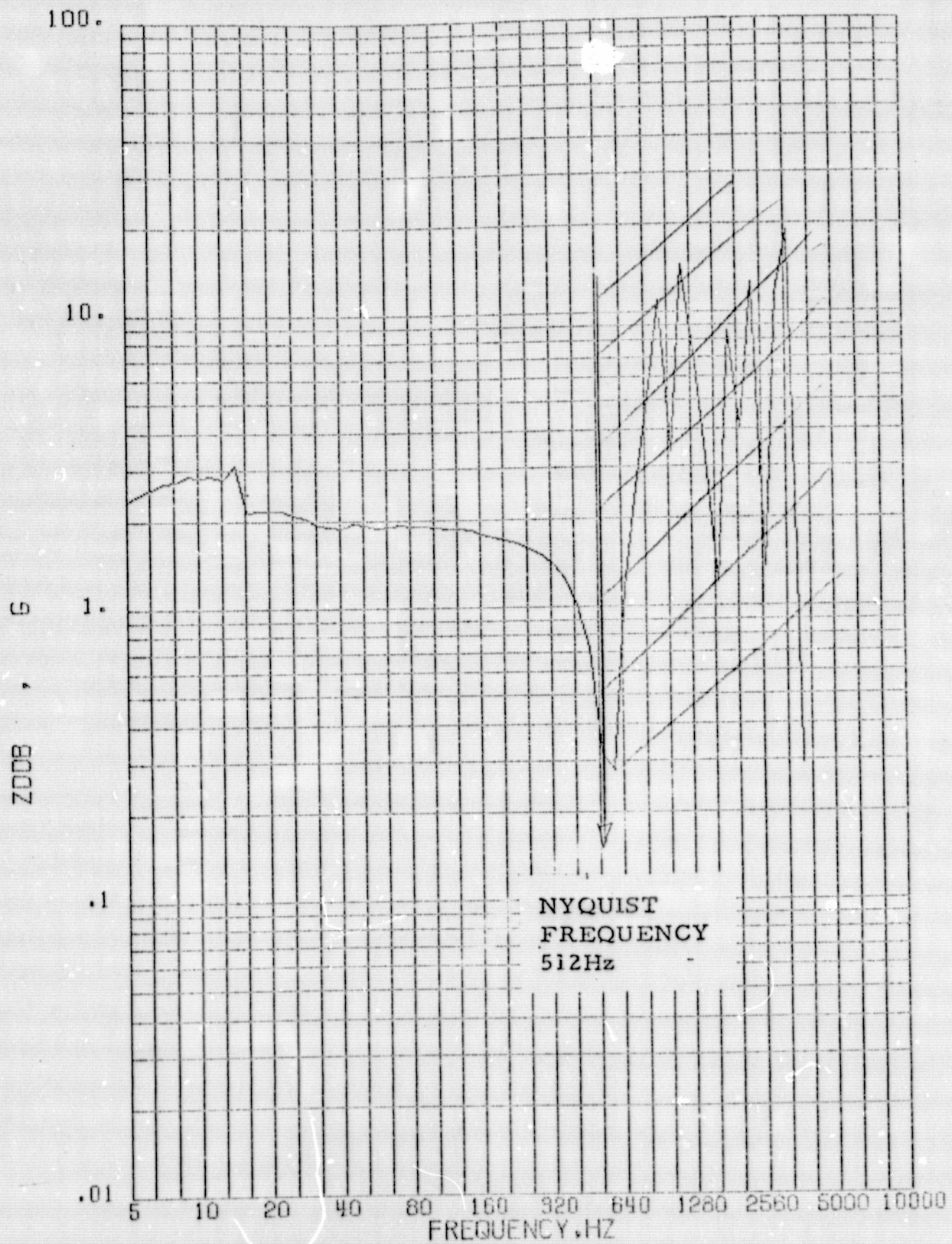
STOP=77181.0000SEC.

GB1

(1024 SPS)

3.83

SHOCK SPECTRUM



START=77178.8000SEC.

STOP=77181.0000SEC.

0=10.

VIKING A

db1

ST G I 80/ST6 II IGN

8/

Z00B

(1024 SPS)

3.84

3.41 b

Figure 3.41b

ORIGINAL PAGE IS
OF POOR QUALITY

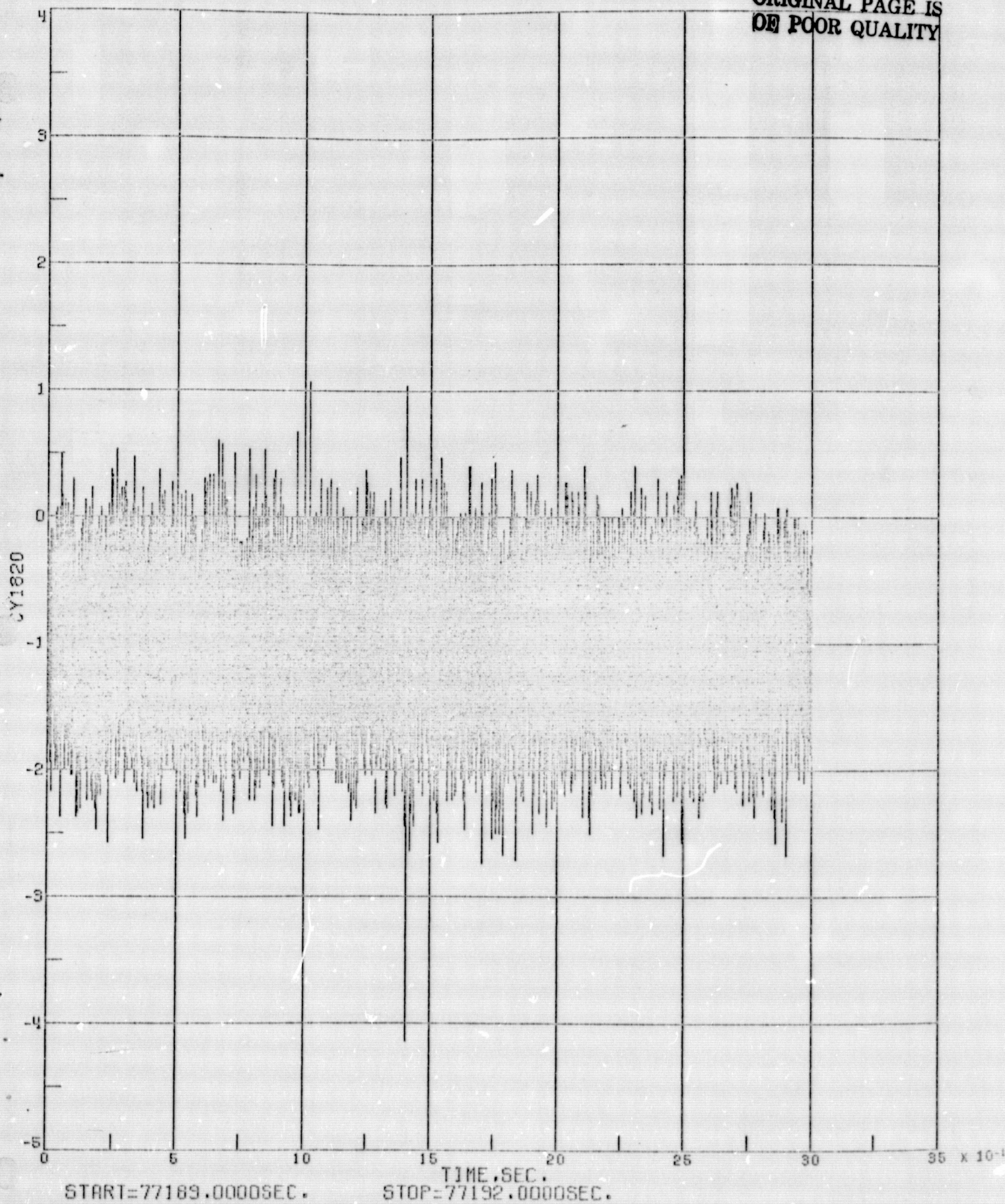
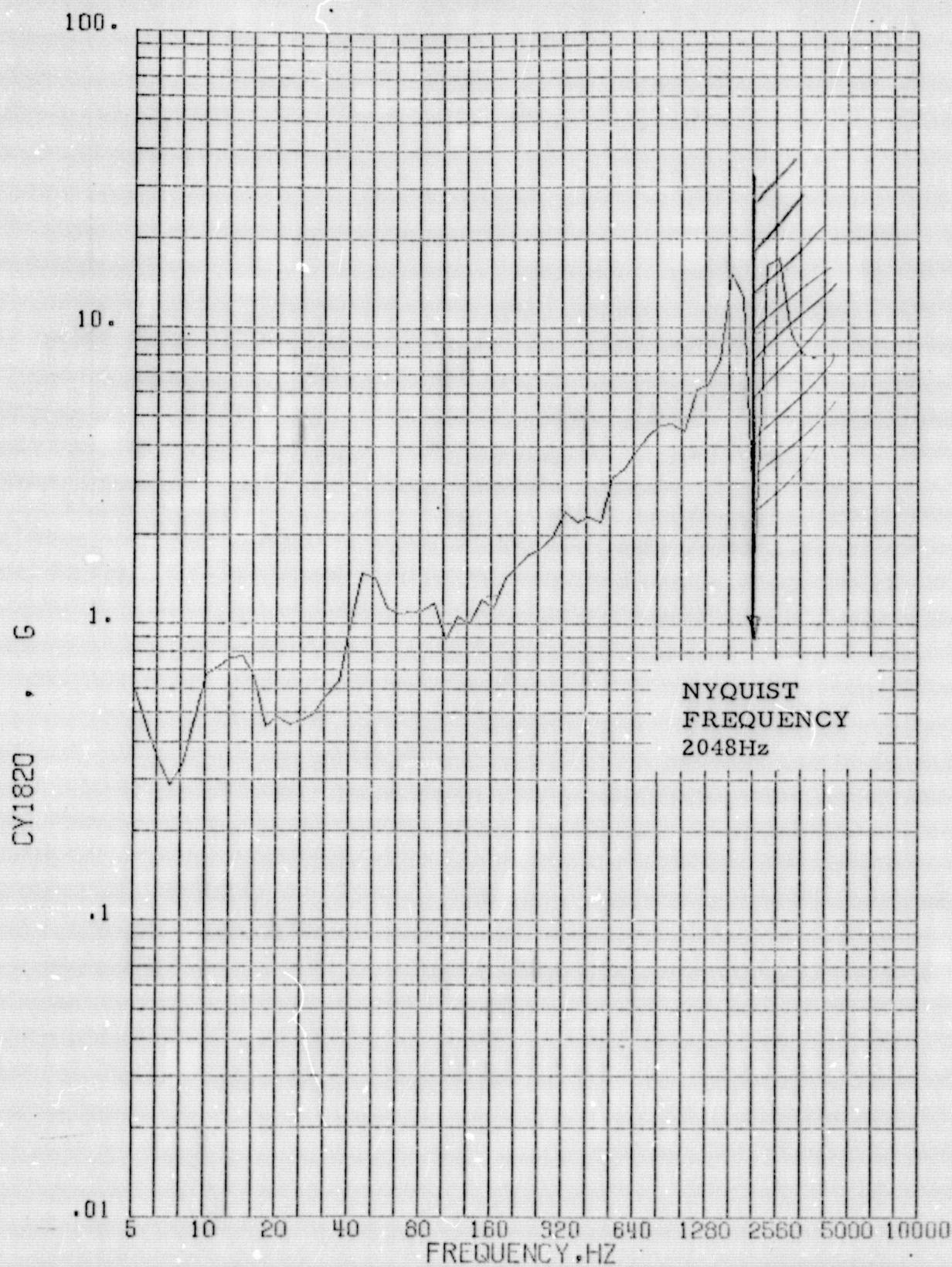


Figure 3.42a

SHOCK SPECTRUM



START=77190.0000SEC. STOP=77192.0000SEC. Q=10.

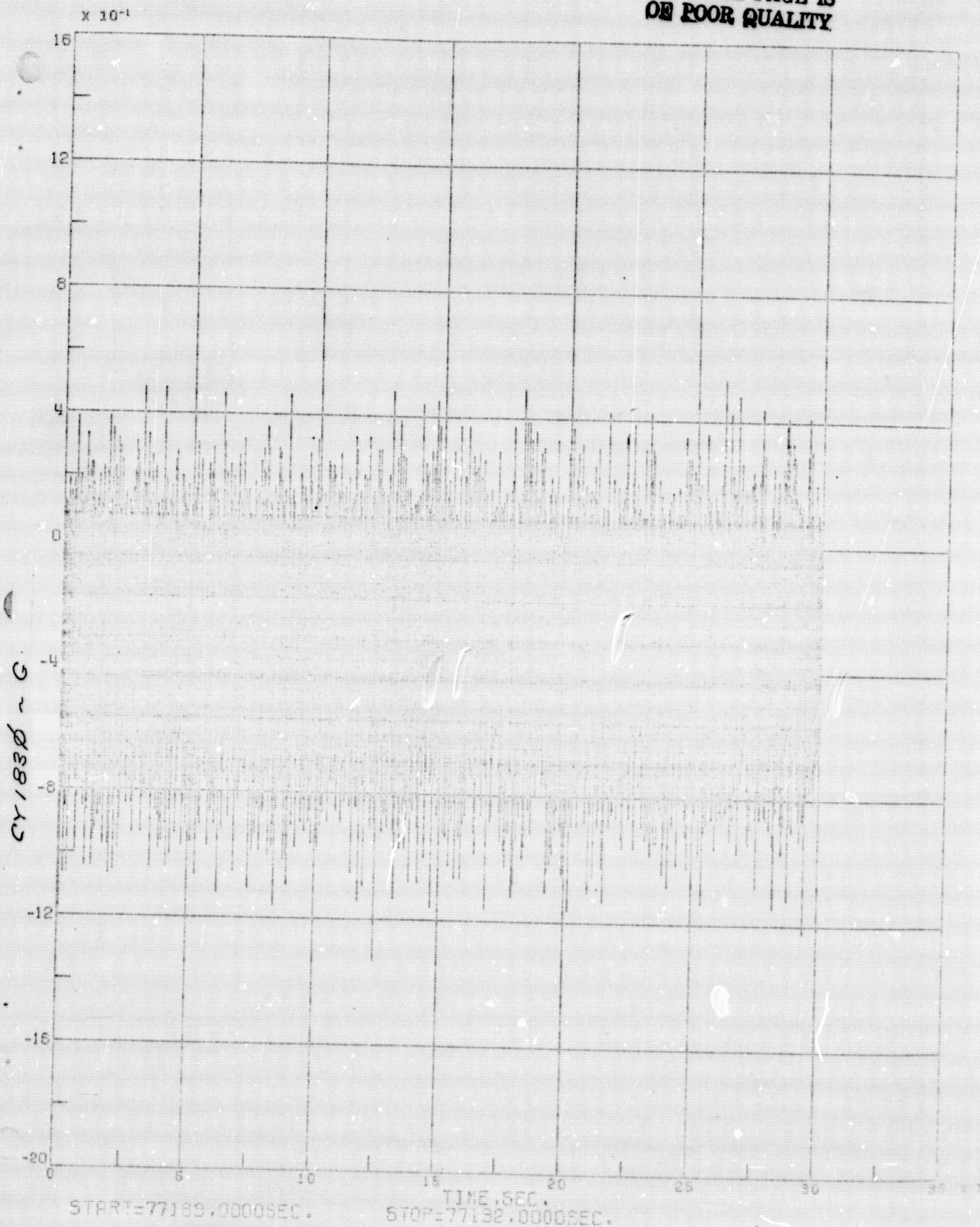
VIKING A

JE TT SHROUD

8/ CY1820

Figure 3.42b

ORIGINAL PAGE IS
OF POOR QUALITY

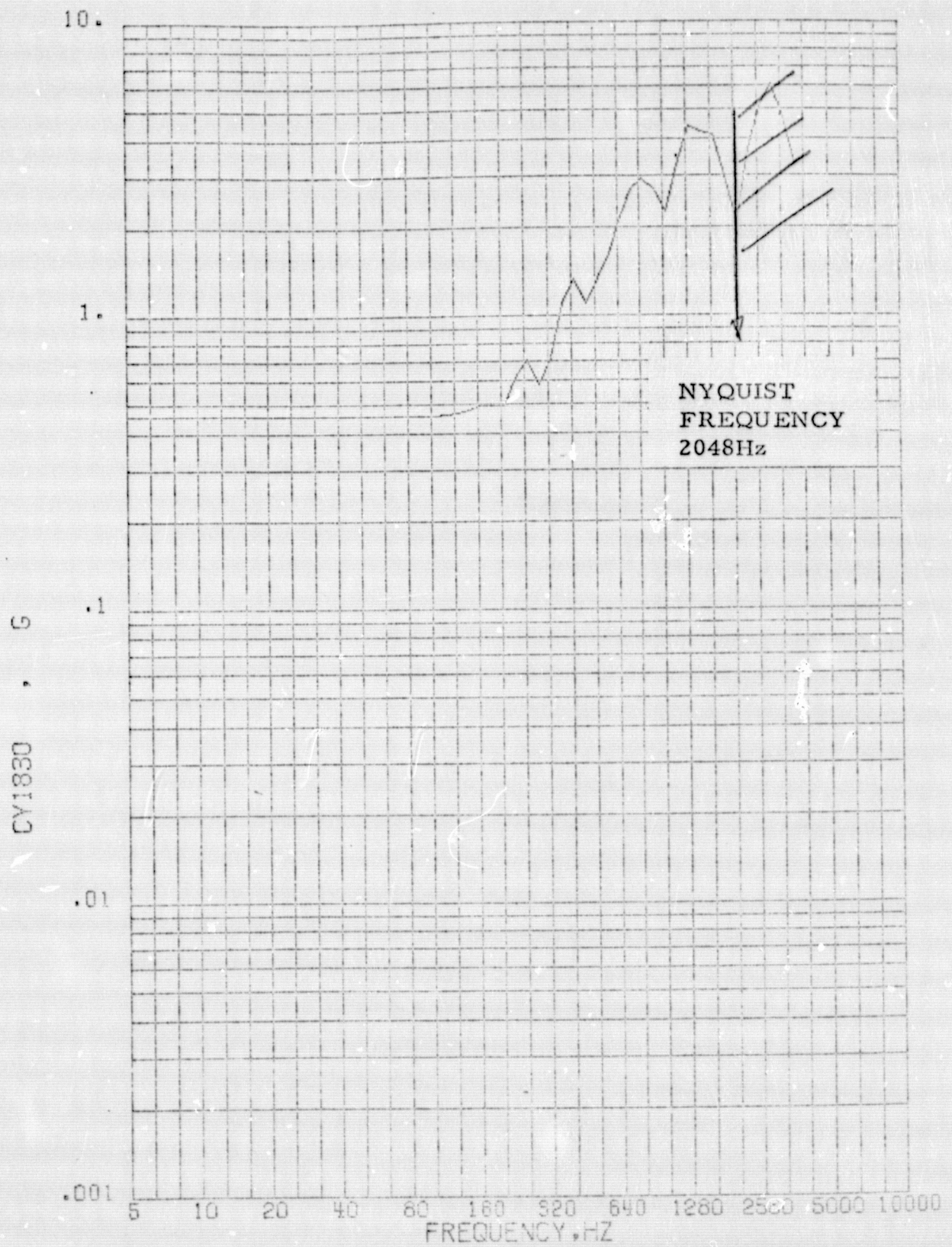


3.07

343 9

Figure 3.43a

SHOCK SPECTRUM



START=77190.0000SEC. STOP=77192.0000SEC. Q=10.

VIKING A. JE TT SHROUD. 8/ CY1830

3.08

3.436

Figure 3.43b

ORIGINAL PAGE IS
OF POOR QUALITY

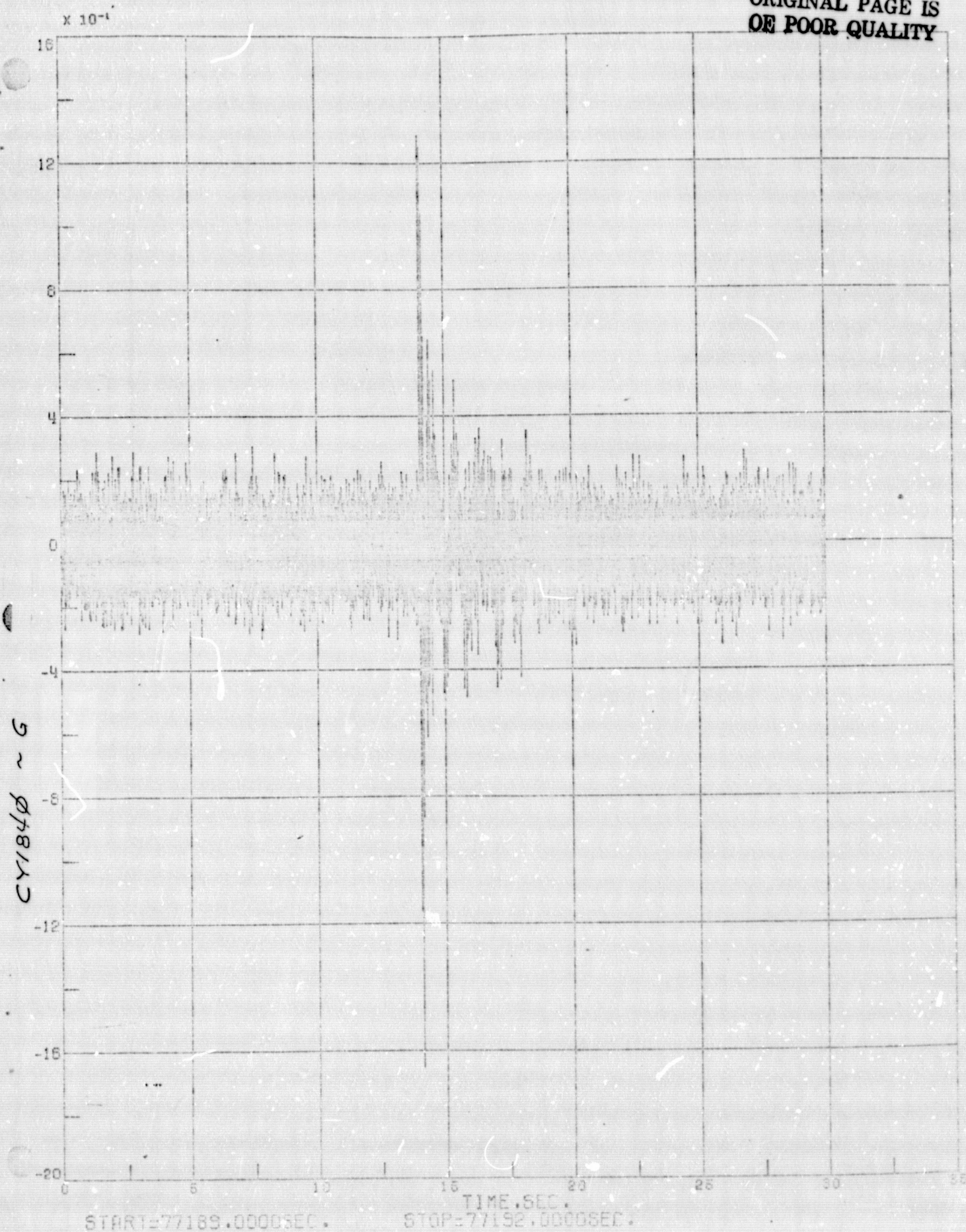
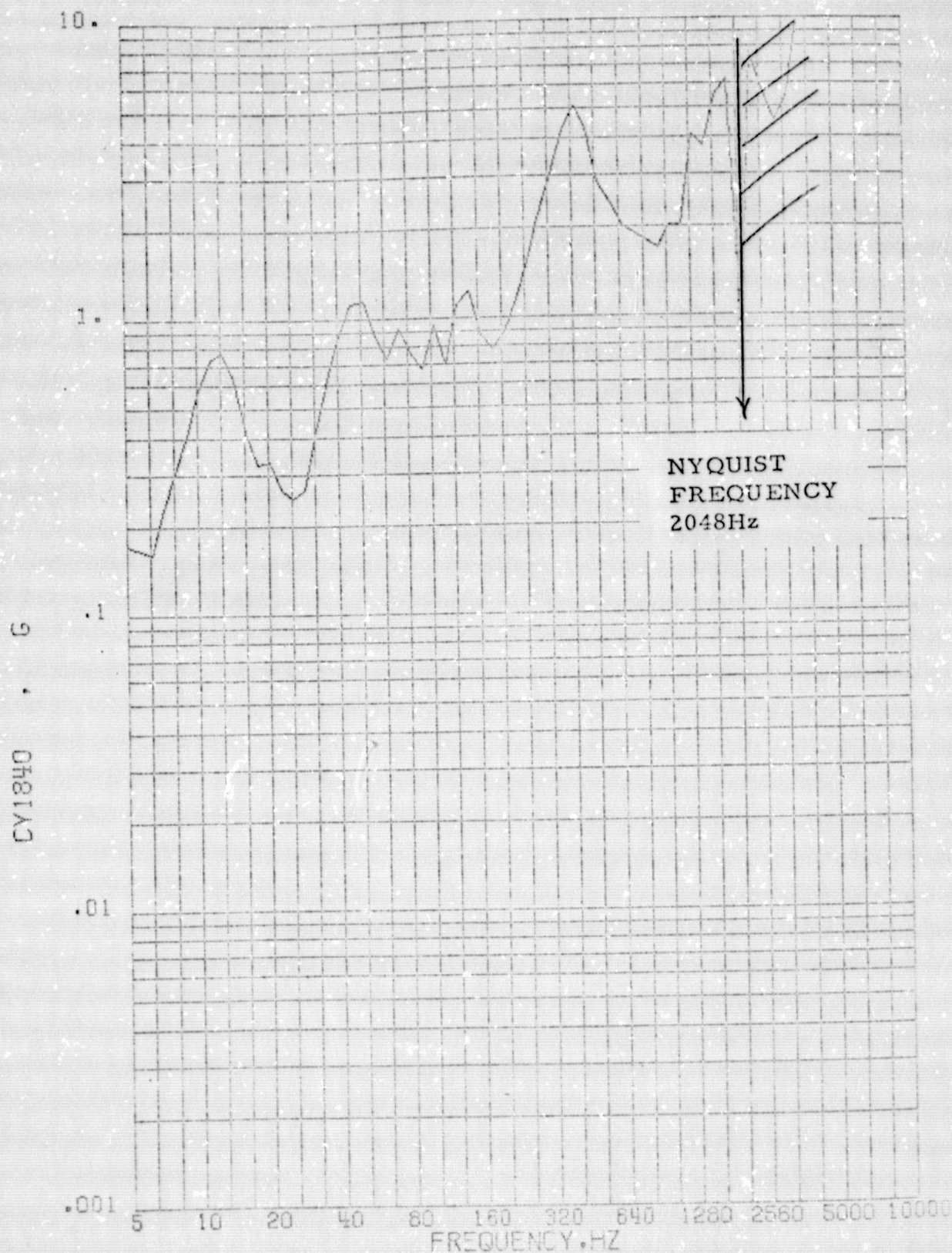


Figure 3.44a

SHOCK SPECTRUM



START=77130.0000SEC.

STOP=77132.0000SEC.

Q=10.

VIKING R

JE TO SHROUD

8/ CV1840

3.90

3.44b

Figure 3.44b

ORIGINAL PAGE IS
OF POOR QUALITY

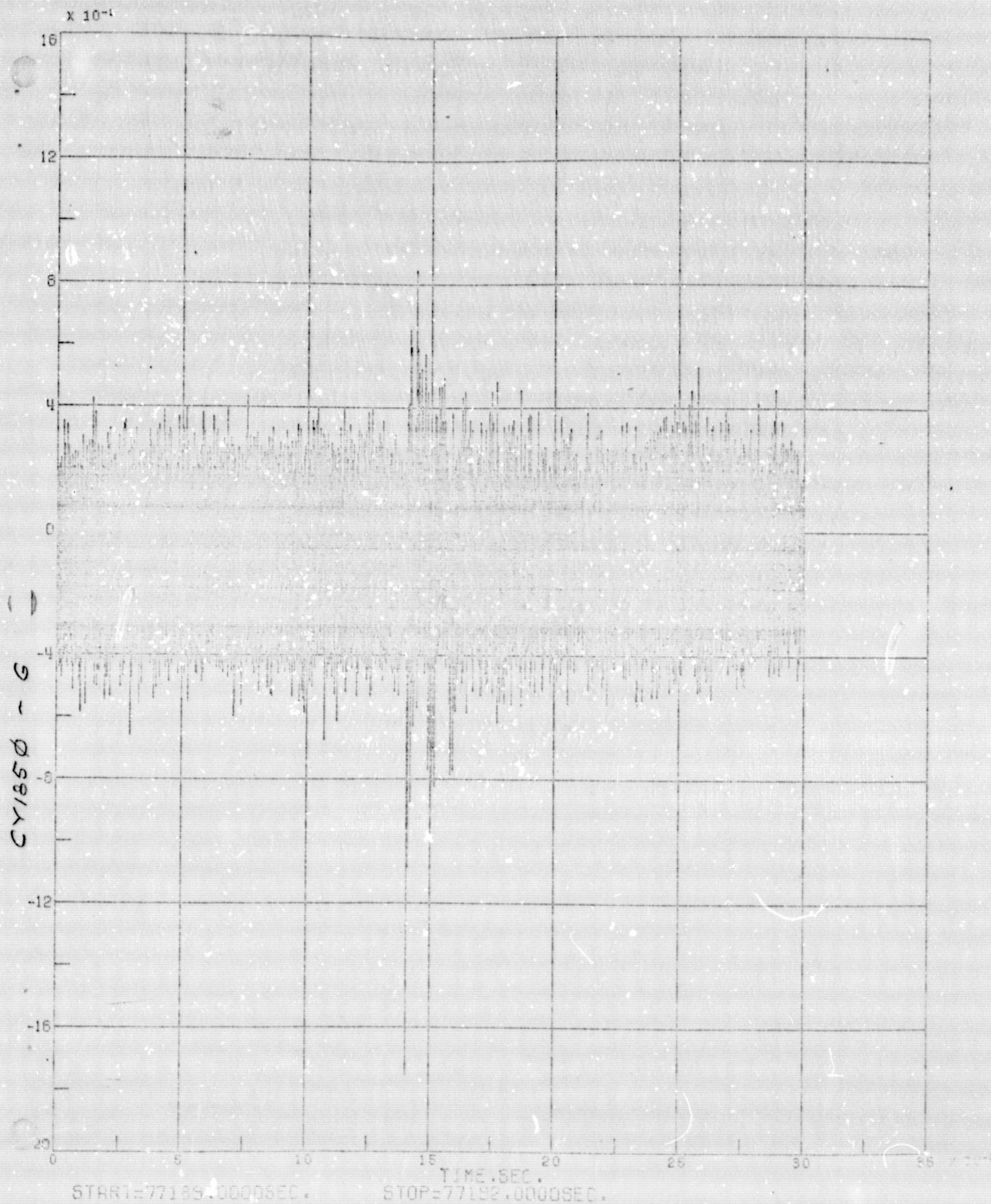
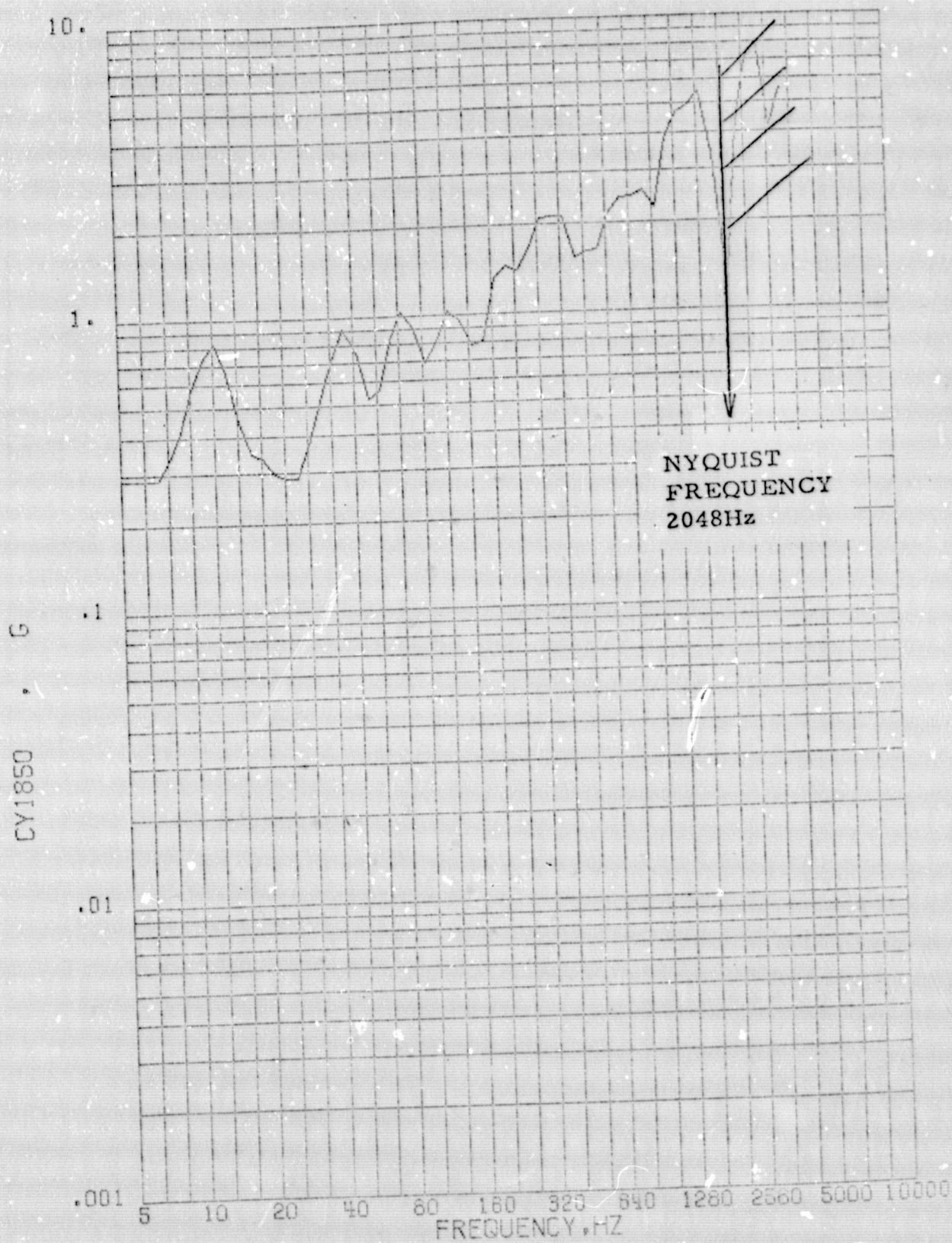


Figure 3.45a

SHOCK SPECTRUM



START=77190.0000SEC.

STOP=77192.0000SEC.

Q=10.

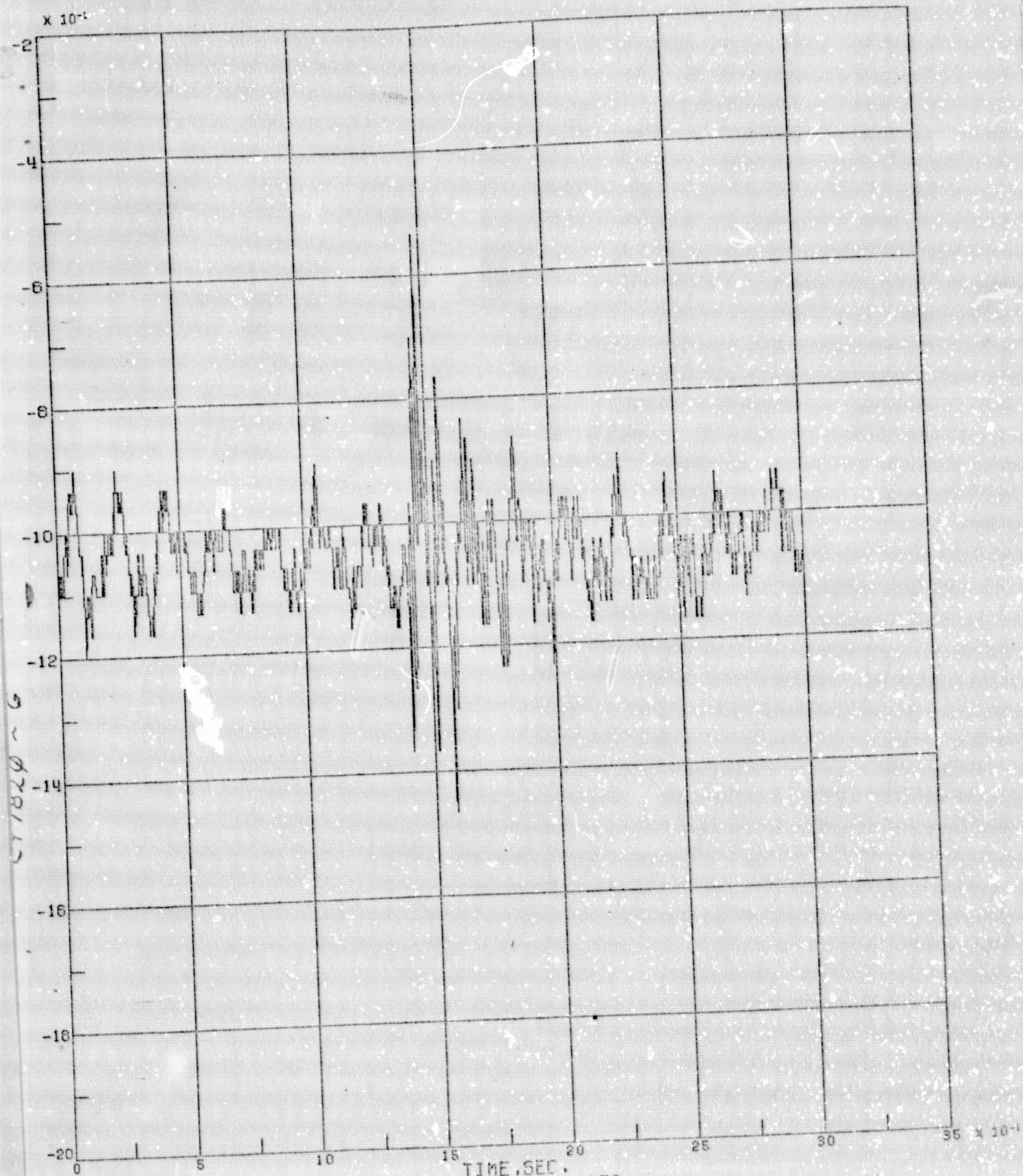
VIKING A

JE TT SHROUD

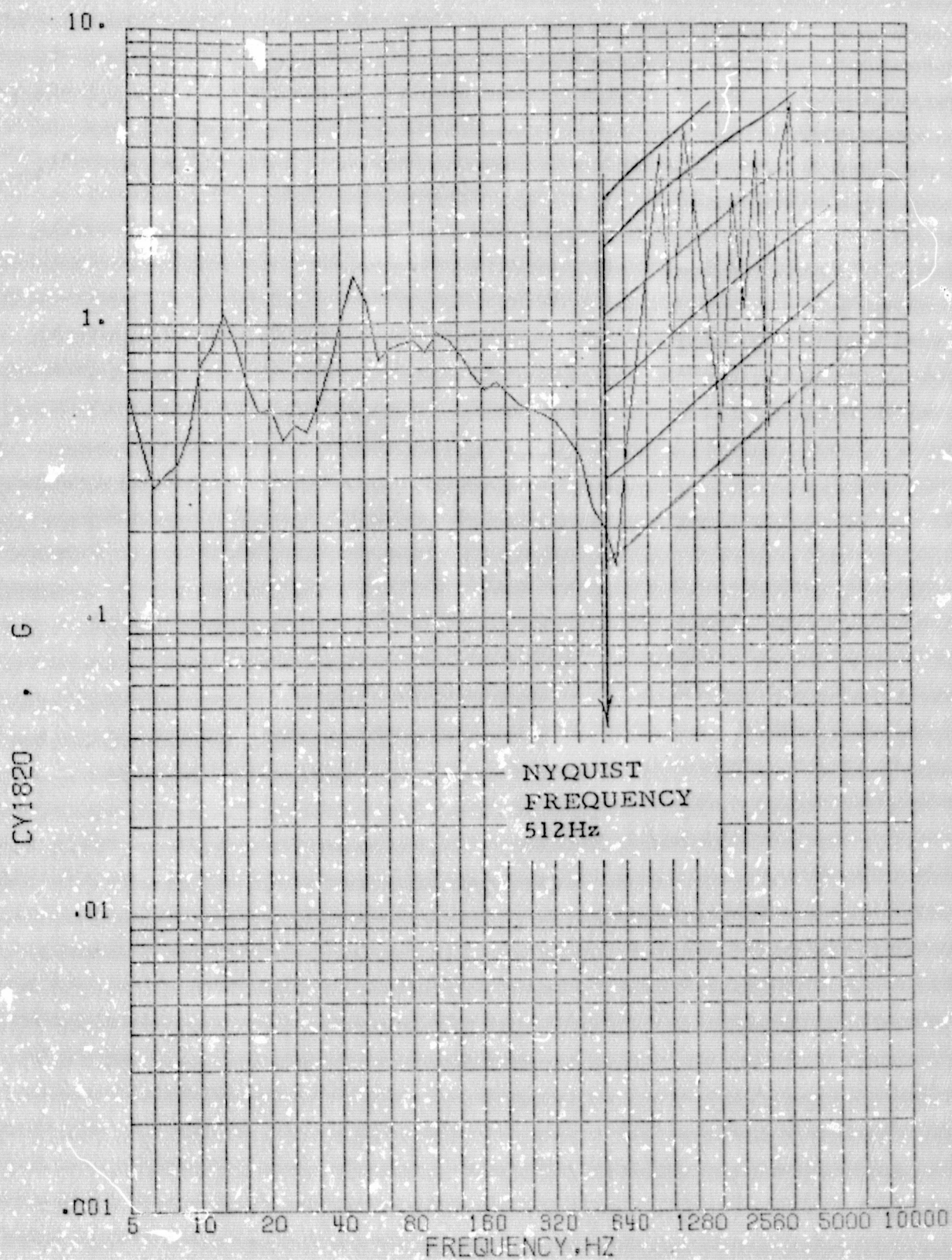
8/ CY1850

3.92
3.45b

Figure 3.45b



SHOCK SPECTRUM



START=77190.0000SEC.

STOP=77192.0000SEC.

Q=10.

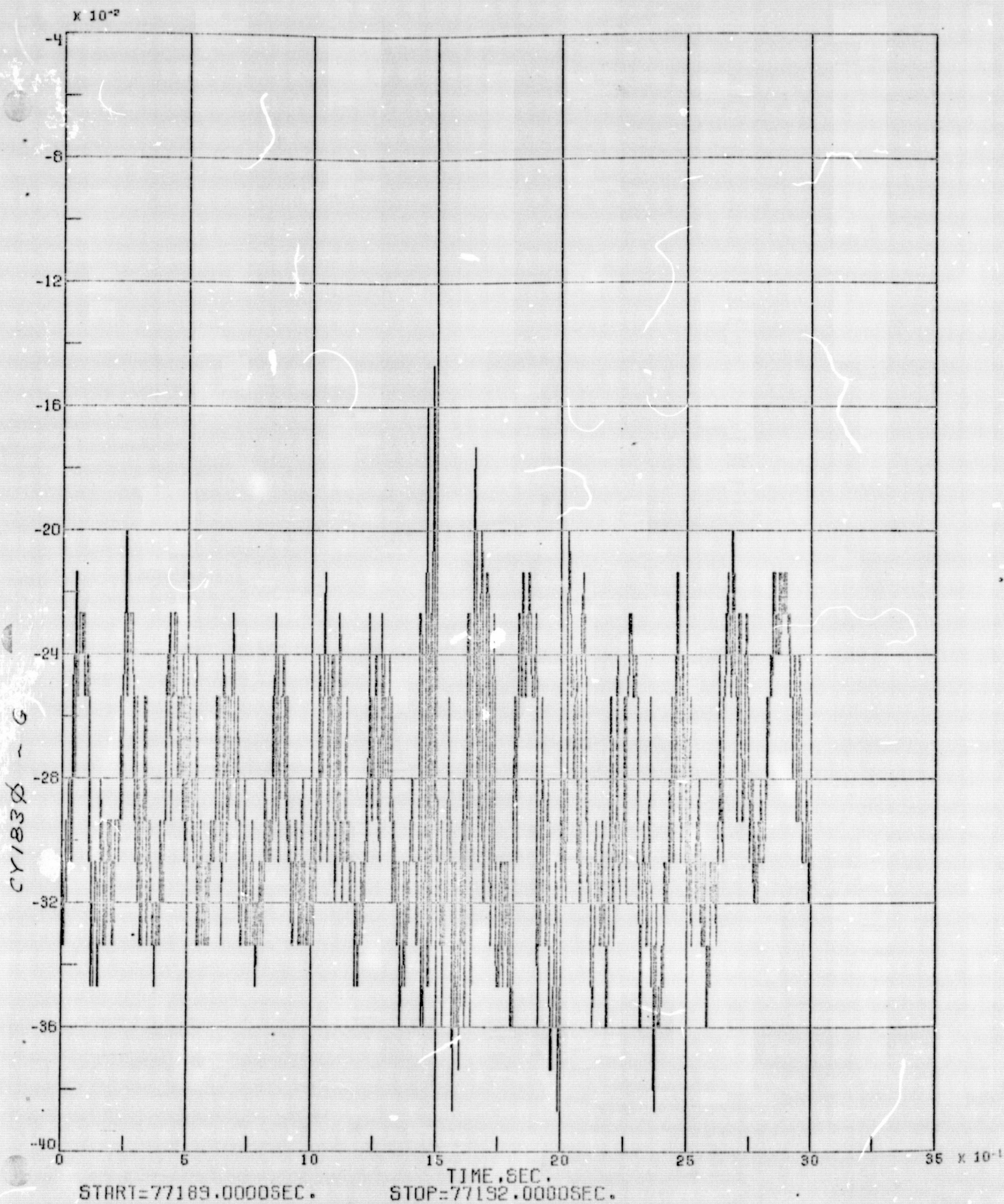
VIKING A

JE TT SHROUD

8/ CY1820

3.94

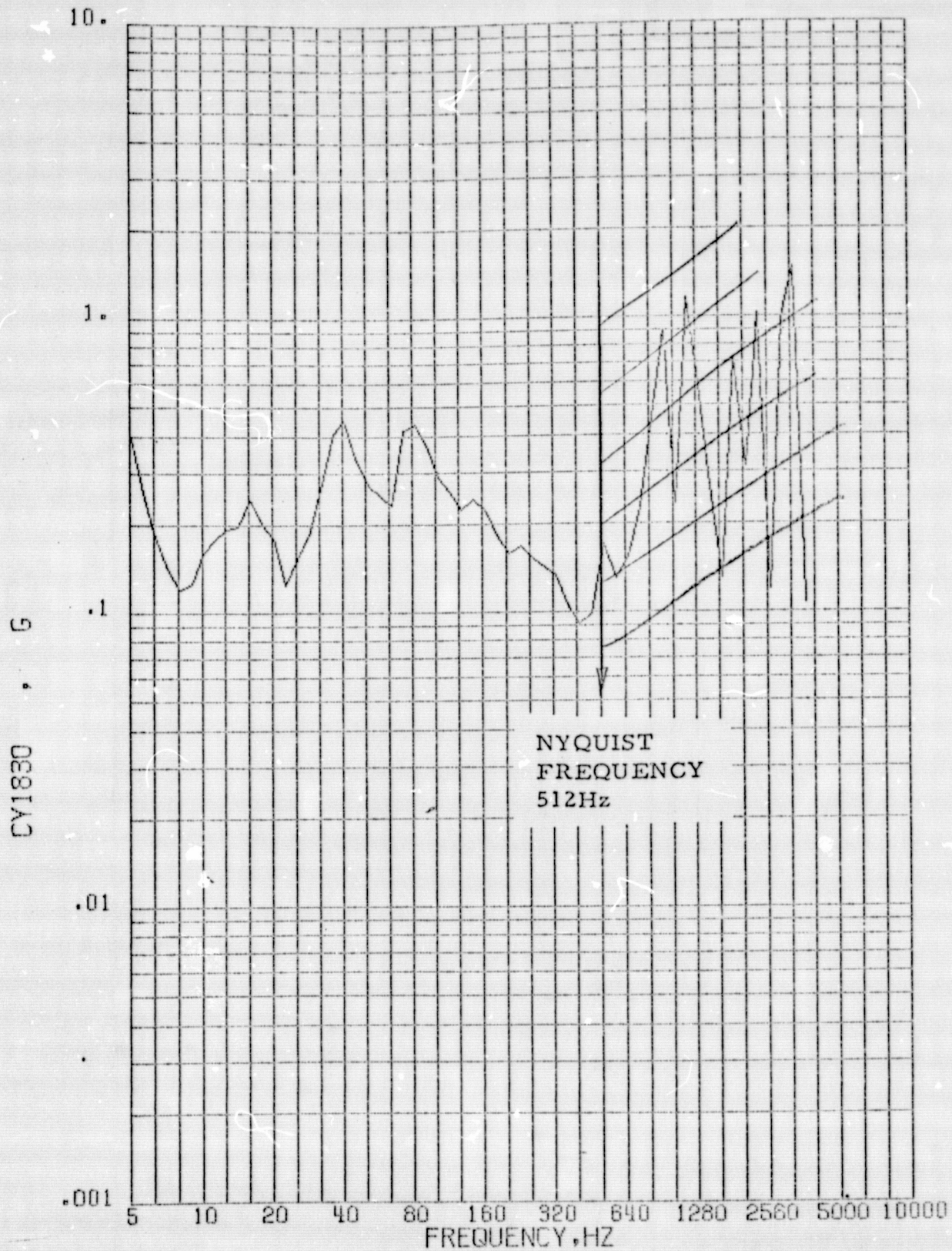
Figure 3.46b



3.95

Figure 3.47a

SHOCK SPECTRUM



START=77190.0000SEC.

STOP=77192.0000SEC.

Q=10.

VIKING A

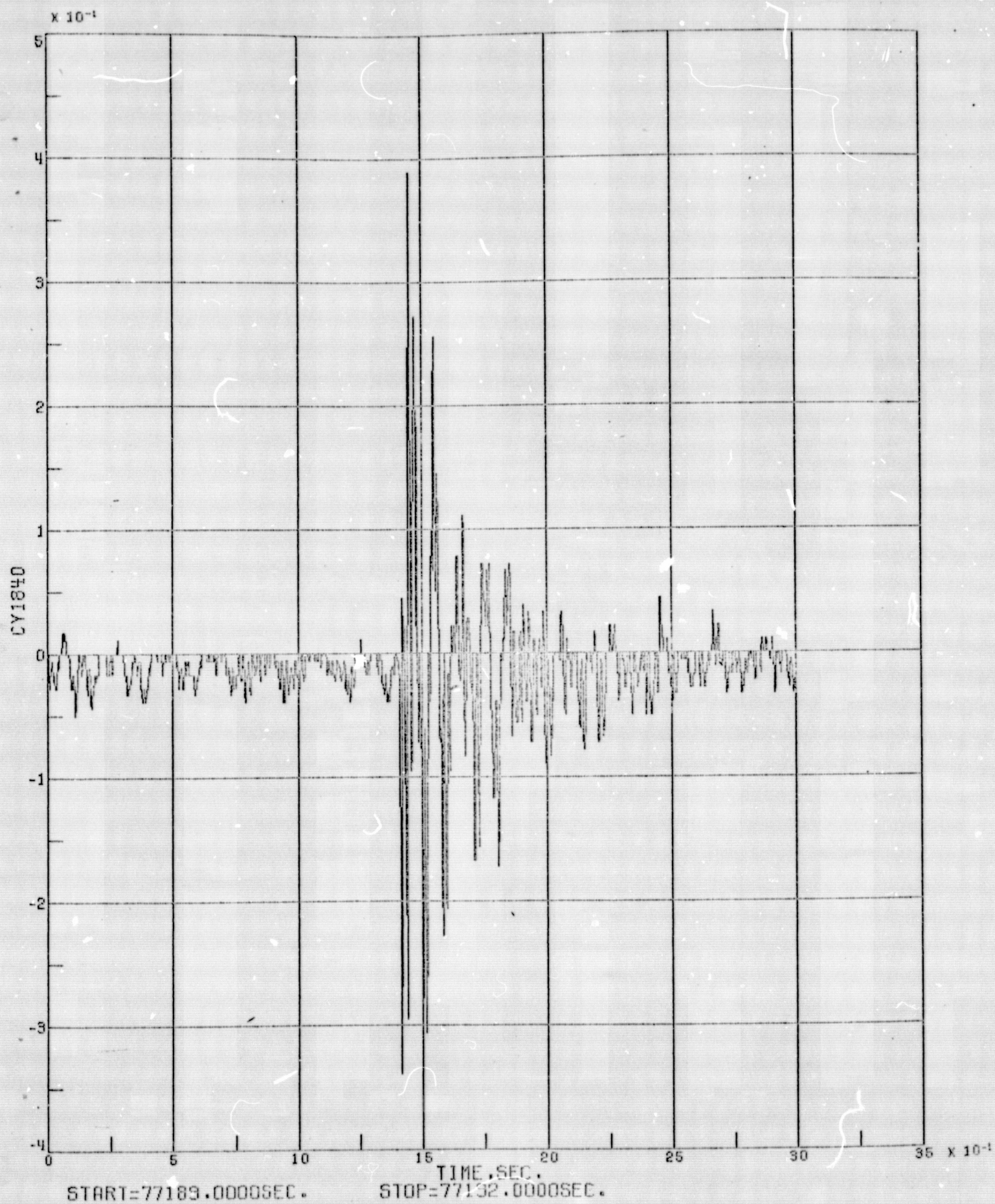
JE TT SHROUD

8/ CY1830

3.96

3.47

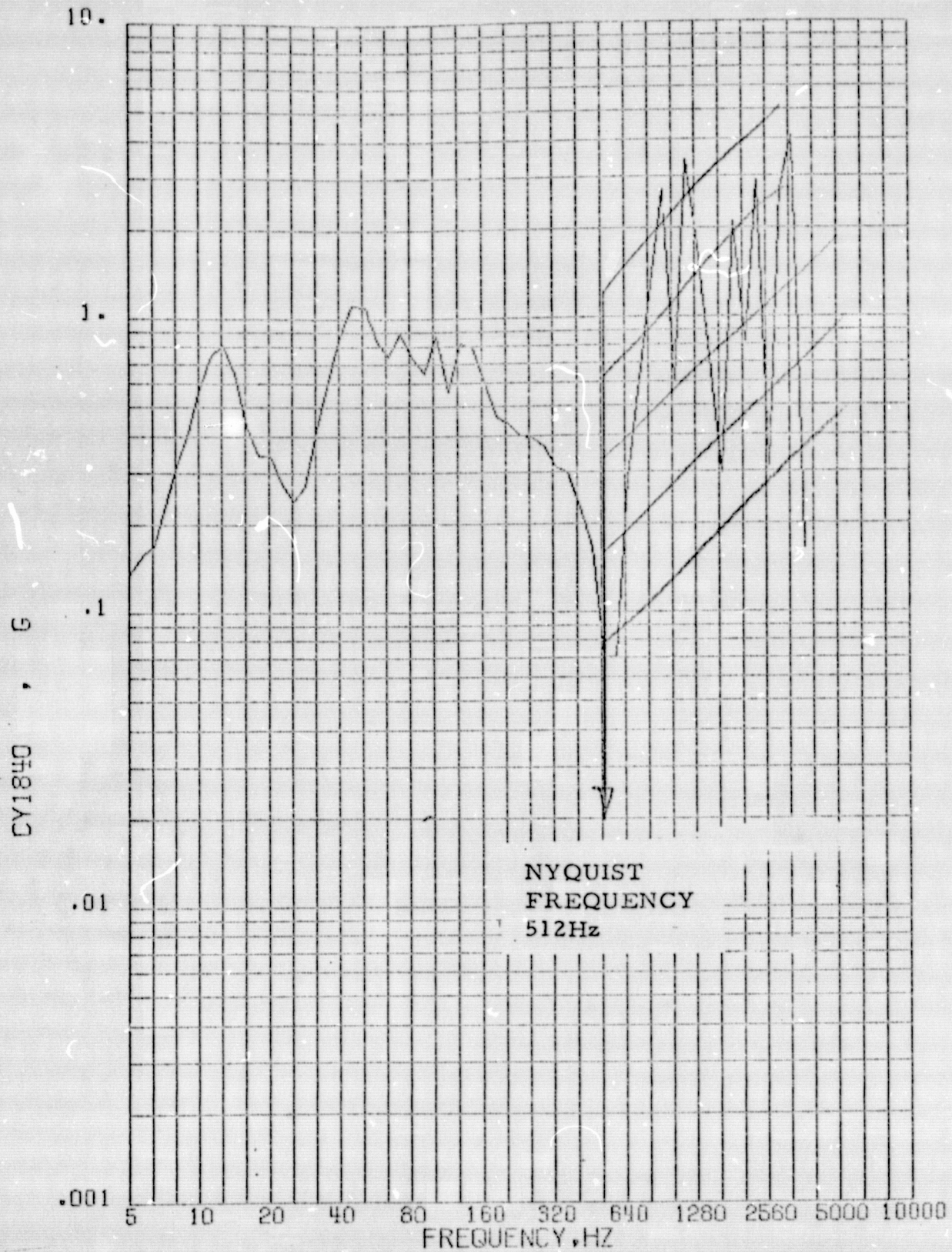
Figure 3.47b



3.97
3.407

Figure 3.48a

SHOCK SPECTRUM



START=77190.0000SEC.

STOP=77192.0000SEC.

Q=10.

VIKING A

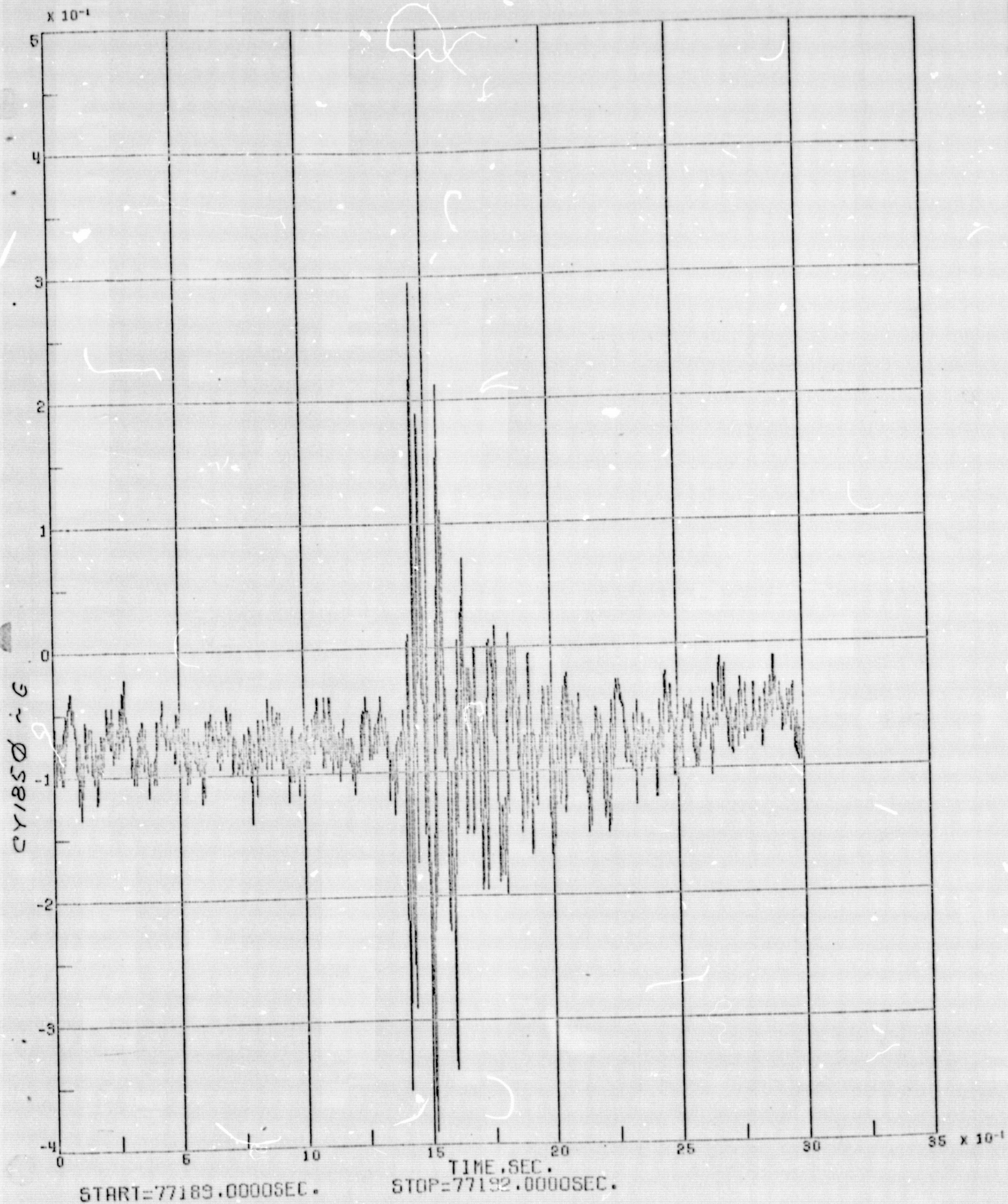
JE TT SHROUD

8/ CY1840

3.98

3.98 b

Figure 3.48b

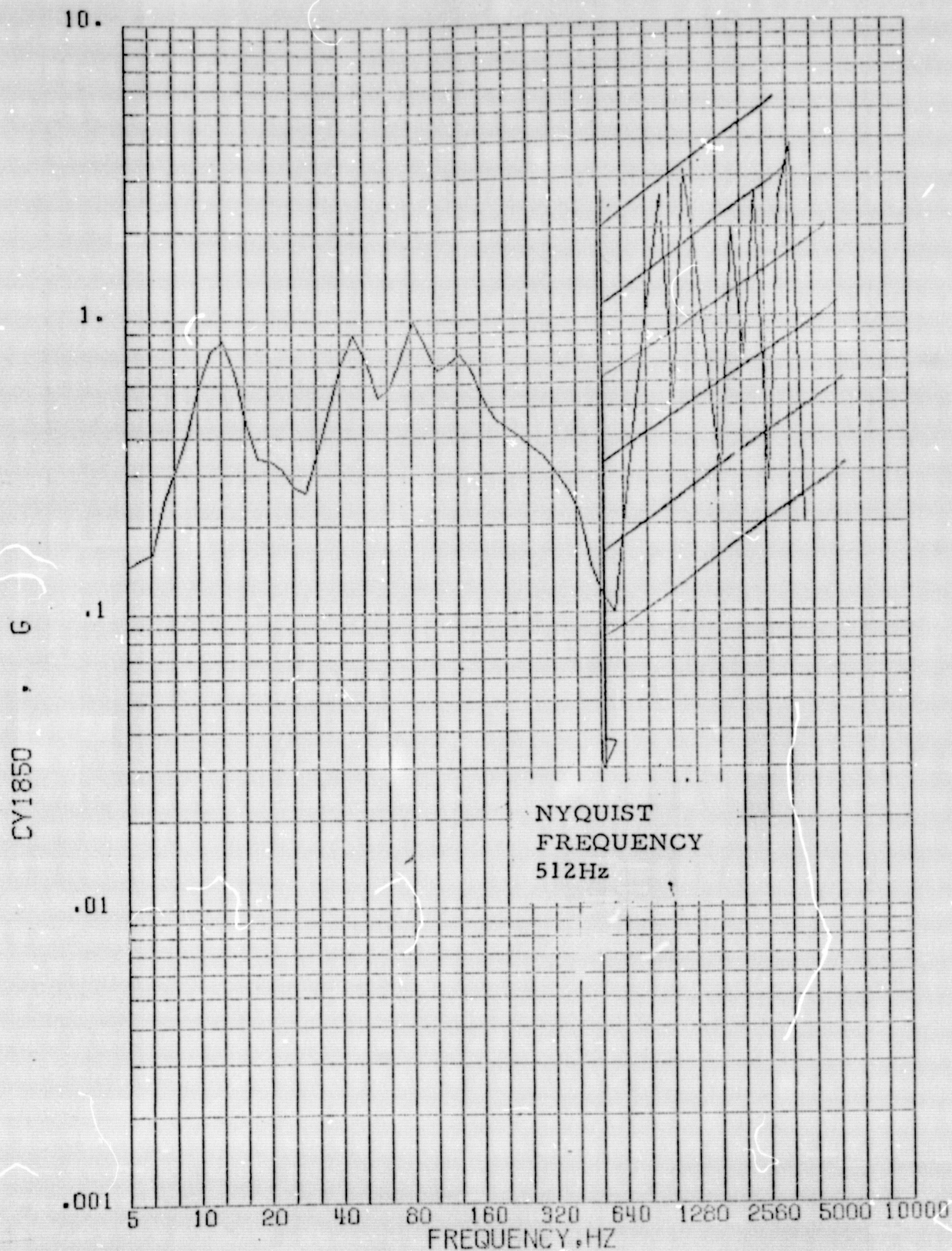


3.99

3.499

Figure 3.49a

SHOCK SPECTRUM



START=77190.0000SEC.

STOP=77192.0000SEC.

Q=10.

VIKING A

JE TT SHROUD

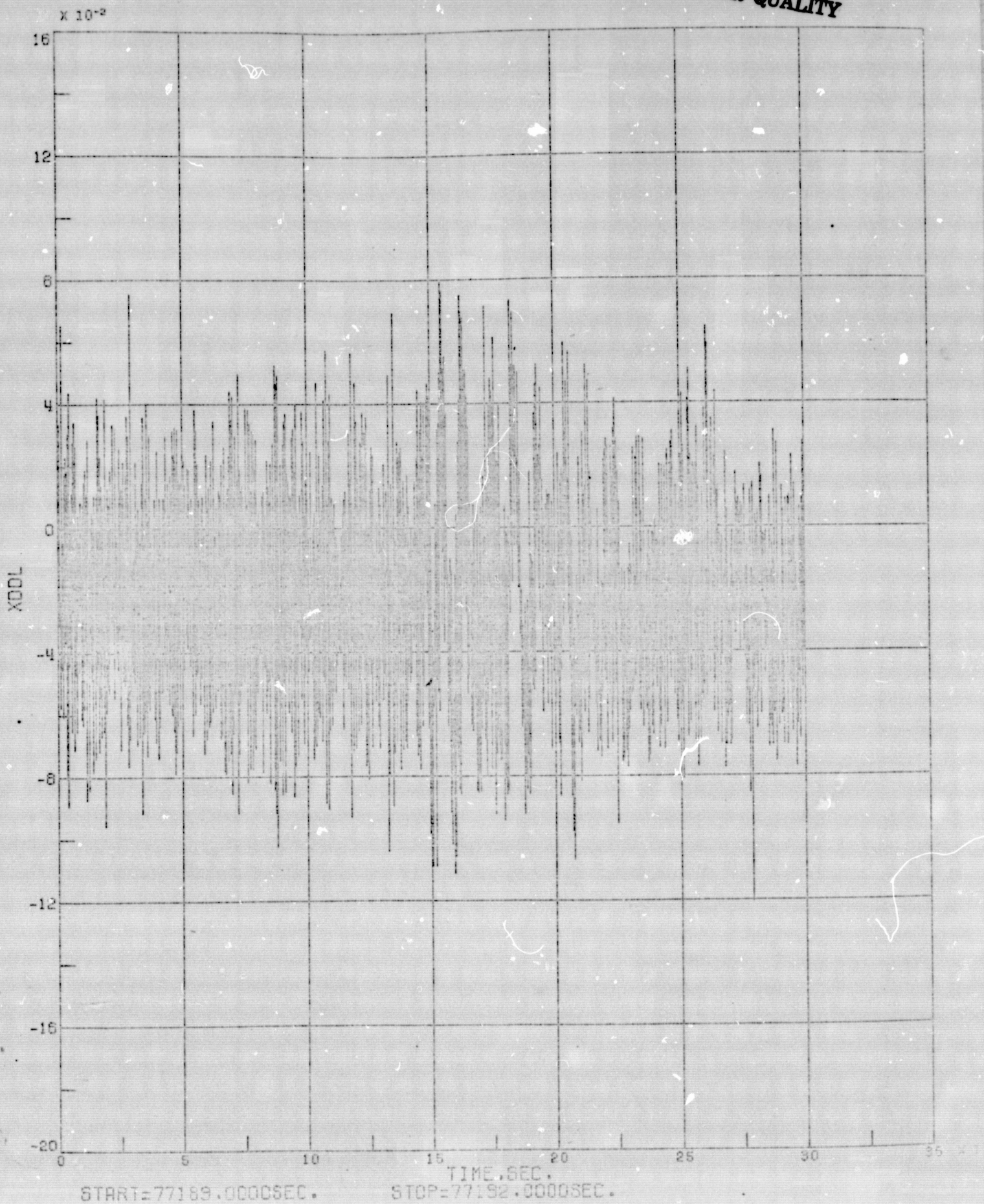
8/ CY1850

3.100

3.496

Figure 3.49b

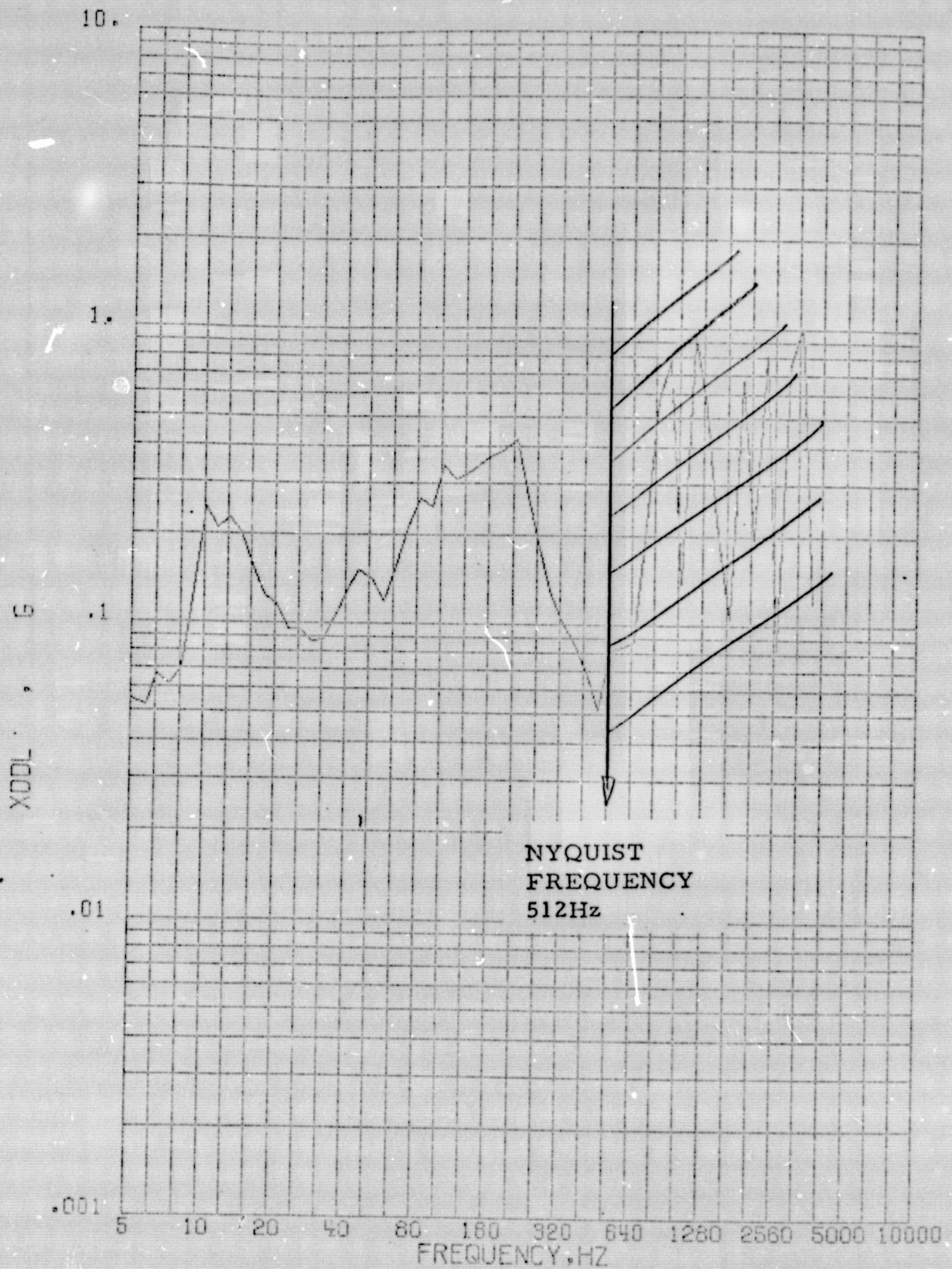
ORIGINAL PAGE IS
OF POOR QUALITY



3.101
2.504

Figure 3.50a

SHOCK SPECTRUM



START=77190.0000SEC.

STOP=77192.0000SEC.

Q=10.

VIKING A

JE TT SHROUD

8/ XDDL

3.102

Figure 3.50b

let

ORIGINAL PAGE IS
OF POOR QUALITY

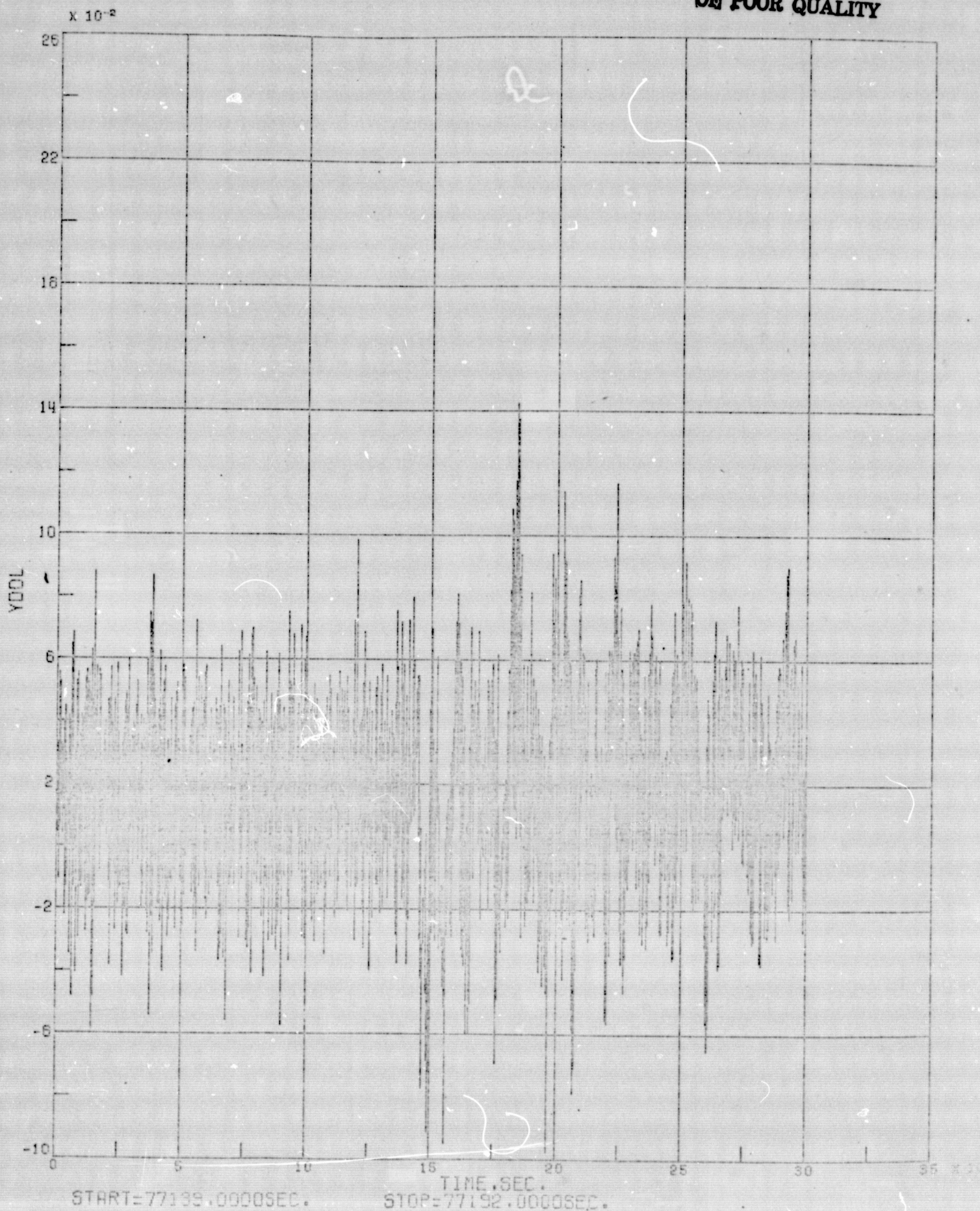
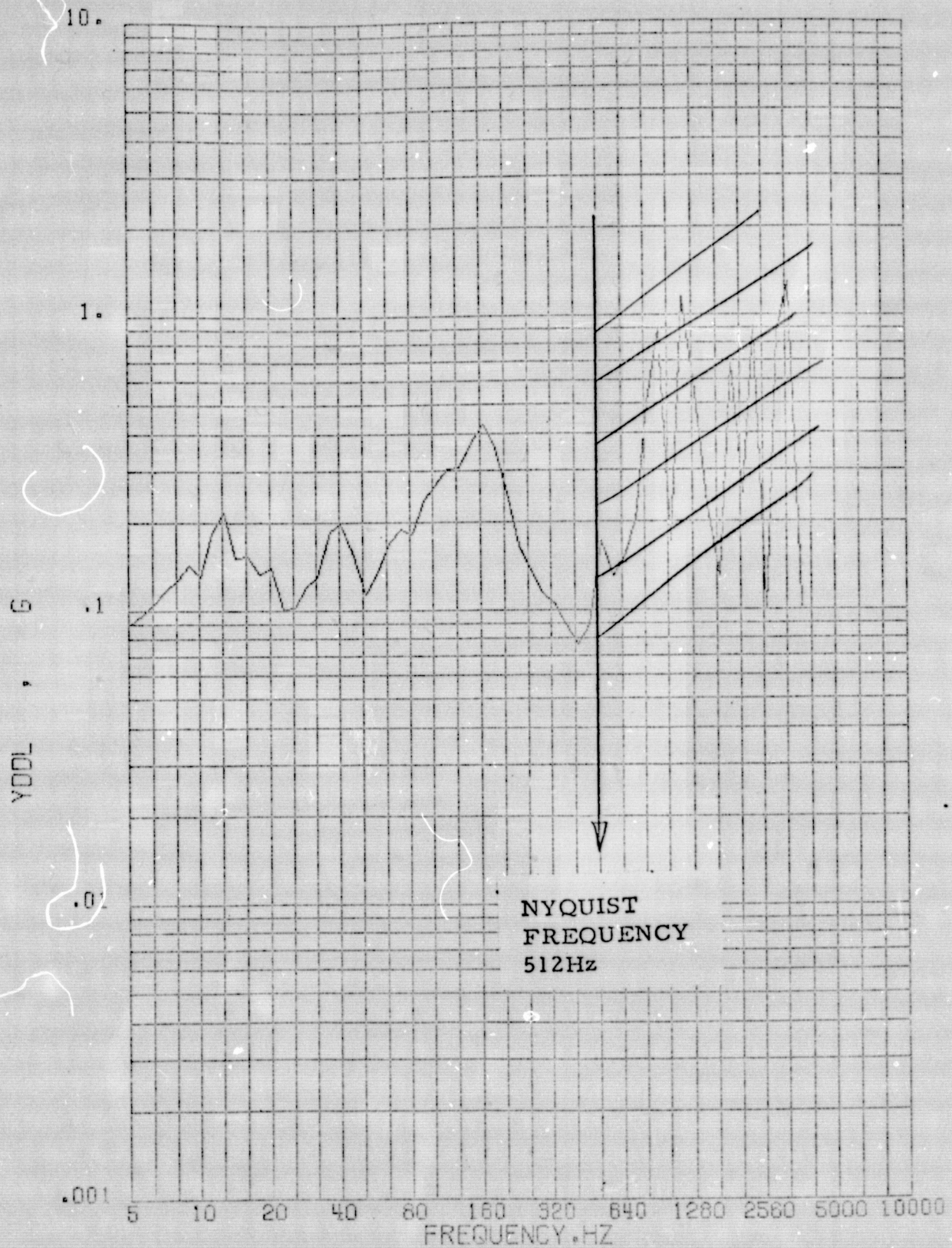


Figure 3.51a

SHOCK SPECTRUM



START=77190.0000SEC. STOP=77192.0000SEC. Q=10.

VIKING A

JE TT SHROUD

8/

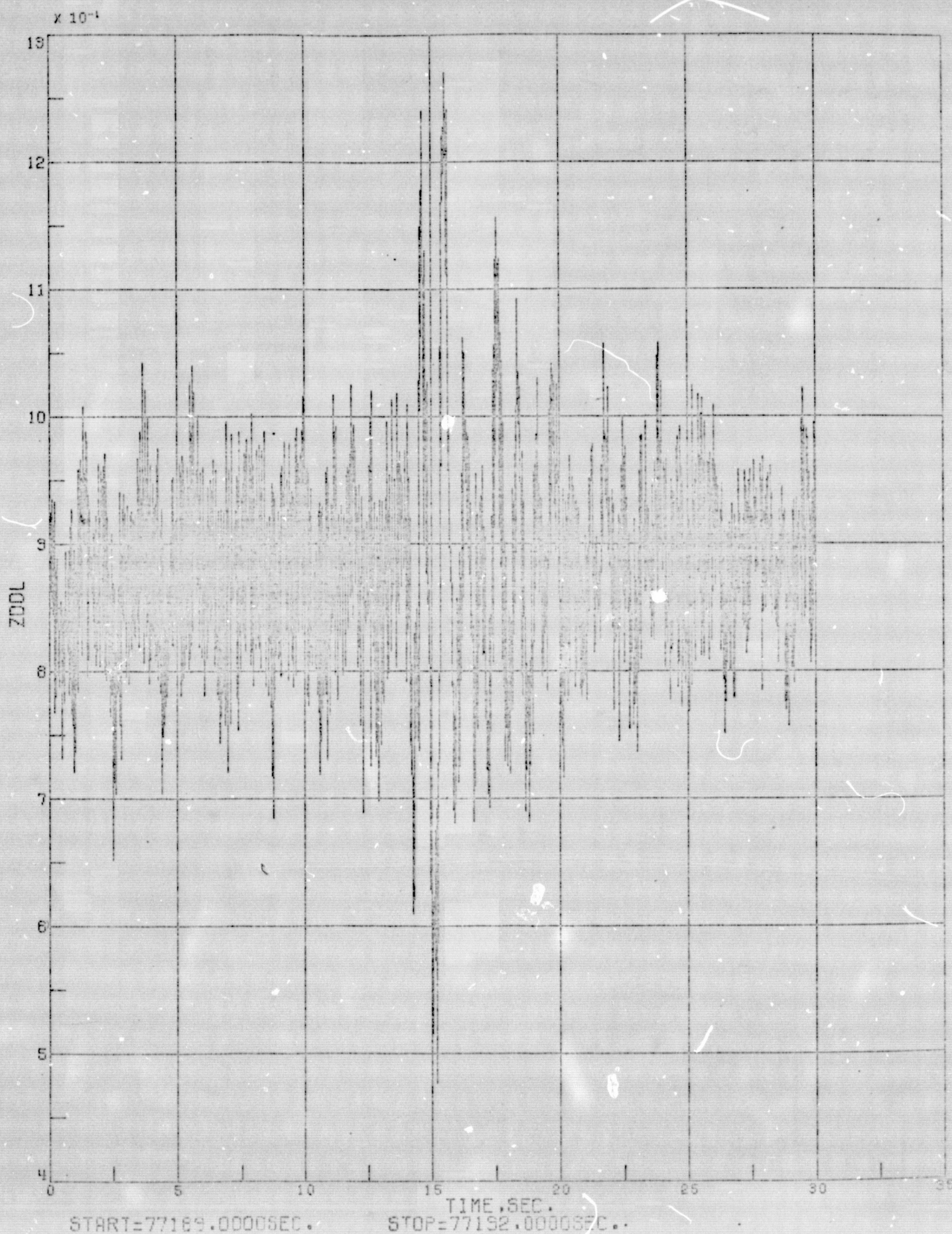
YDDL

3.104

Figure 3.51b

not

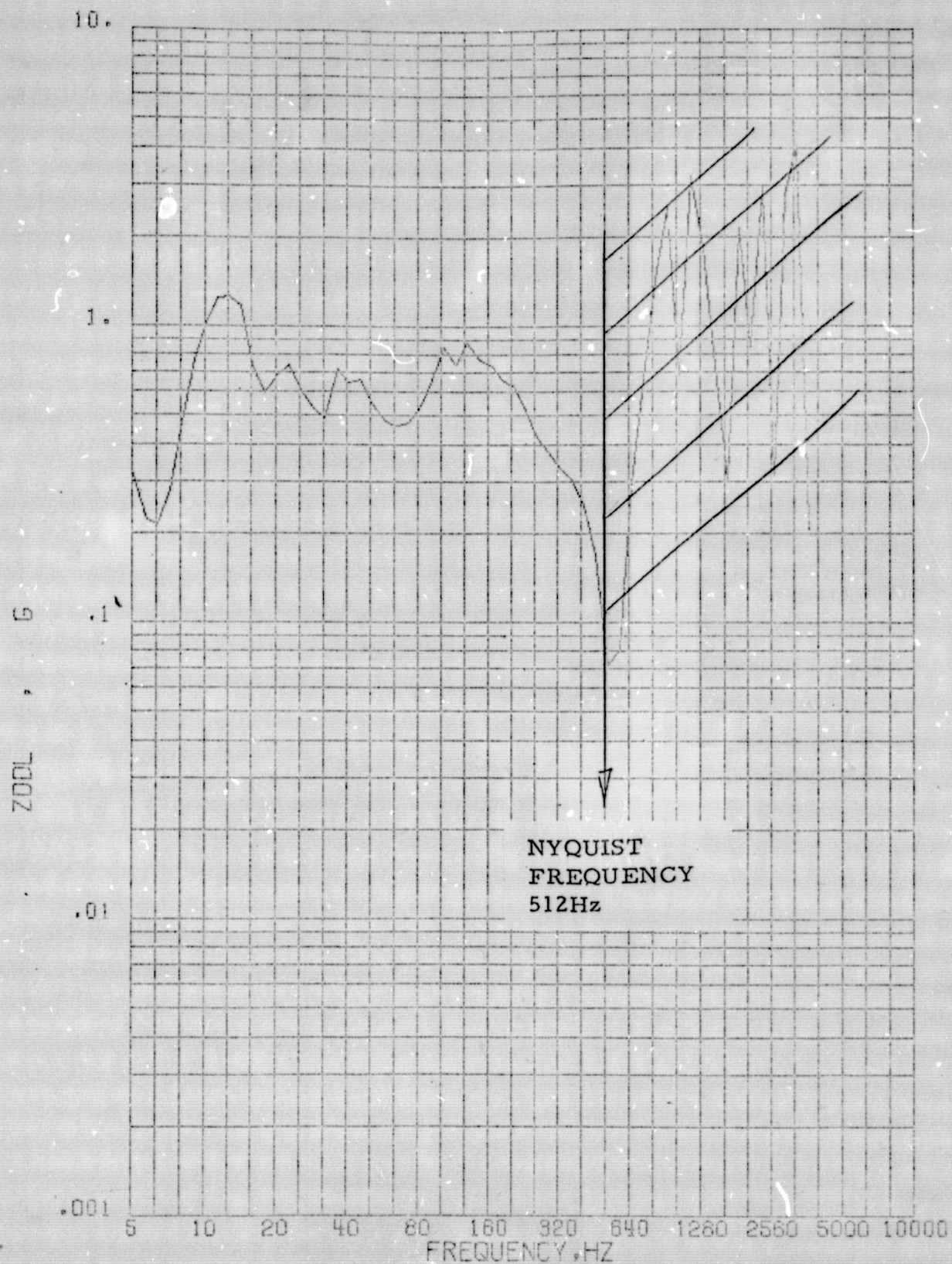
ORIGINAL PAGE IS
OF POOR QUALITY



370529

Figure 3. 52a

SHOCK SPECTRUM



START=77190.0000SEC. STOP=77192.0000SEC. Q=10.

VIKING A

JE TT SHROUD

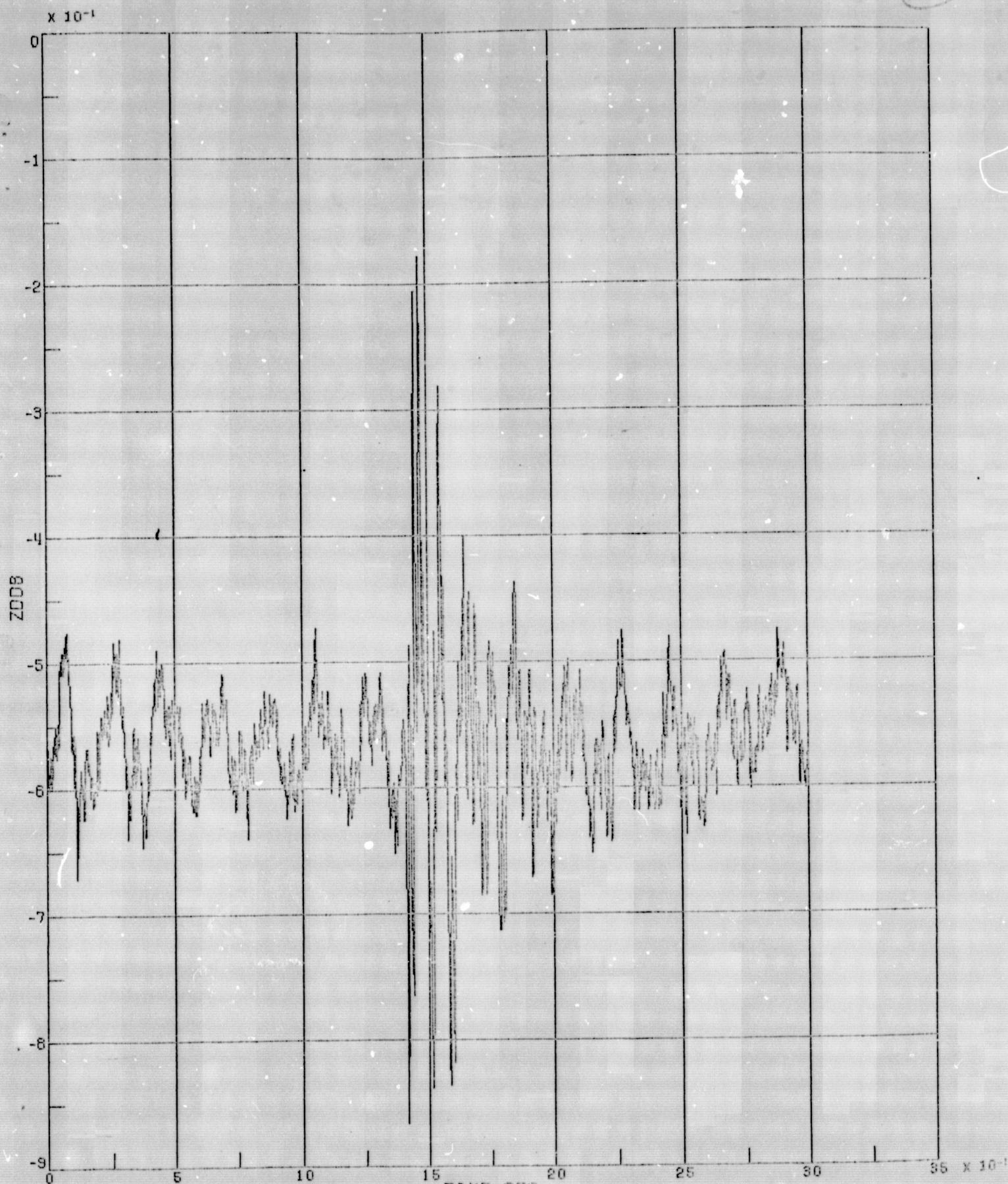
8/ Z00L

3.106 b

Figure 3.52b

Long

10



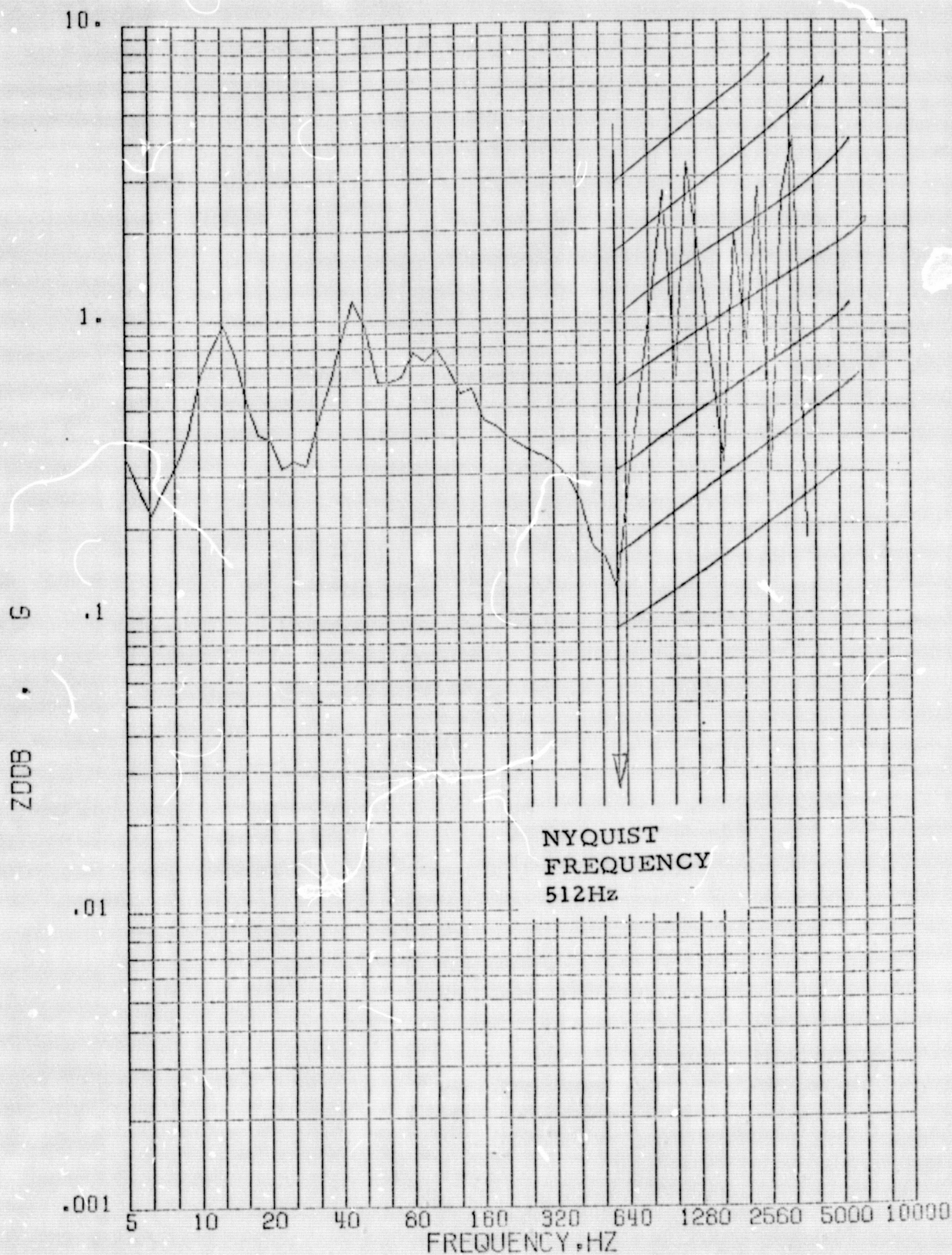
START=77189.0000SEC.

STOP=77192.0000SEC.

3.529
3.107

Figure 3.53a

SHOCK SPECTRUM



START=77190.0000 SEC.

STOP=77192.0000 SEC.

Q=10.

VIKING A

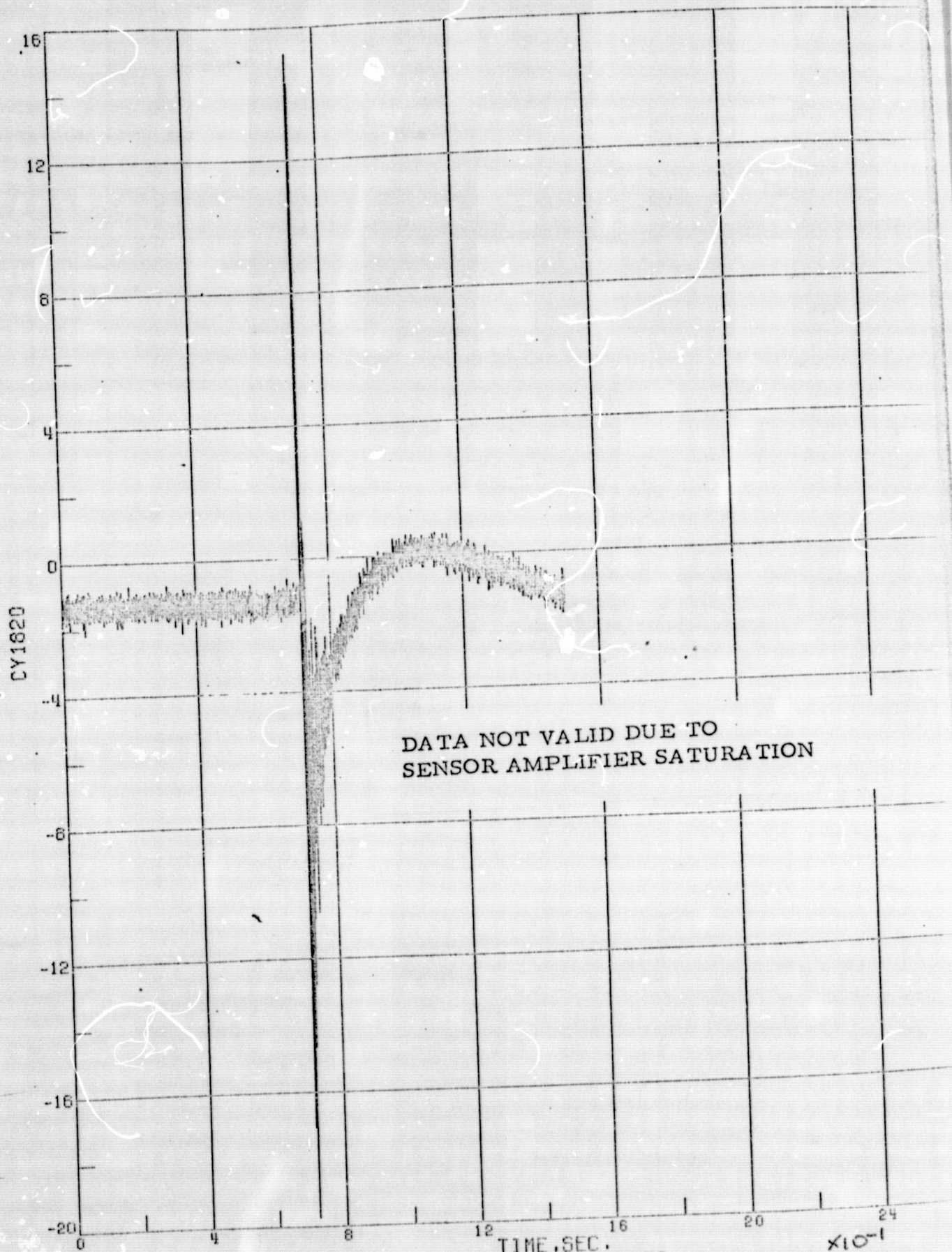
JE TT SHROUD

8/ Z008

3.53.b

3.108

Figure 3.53b



START=77393.3000SEC.

STOP=77394.8000SEC.

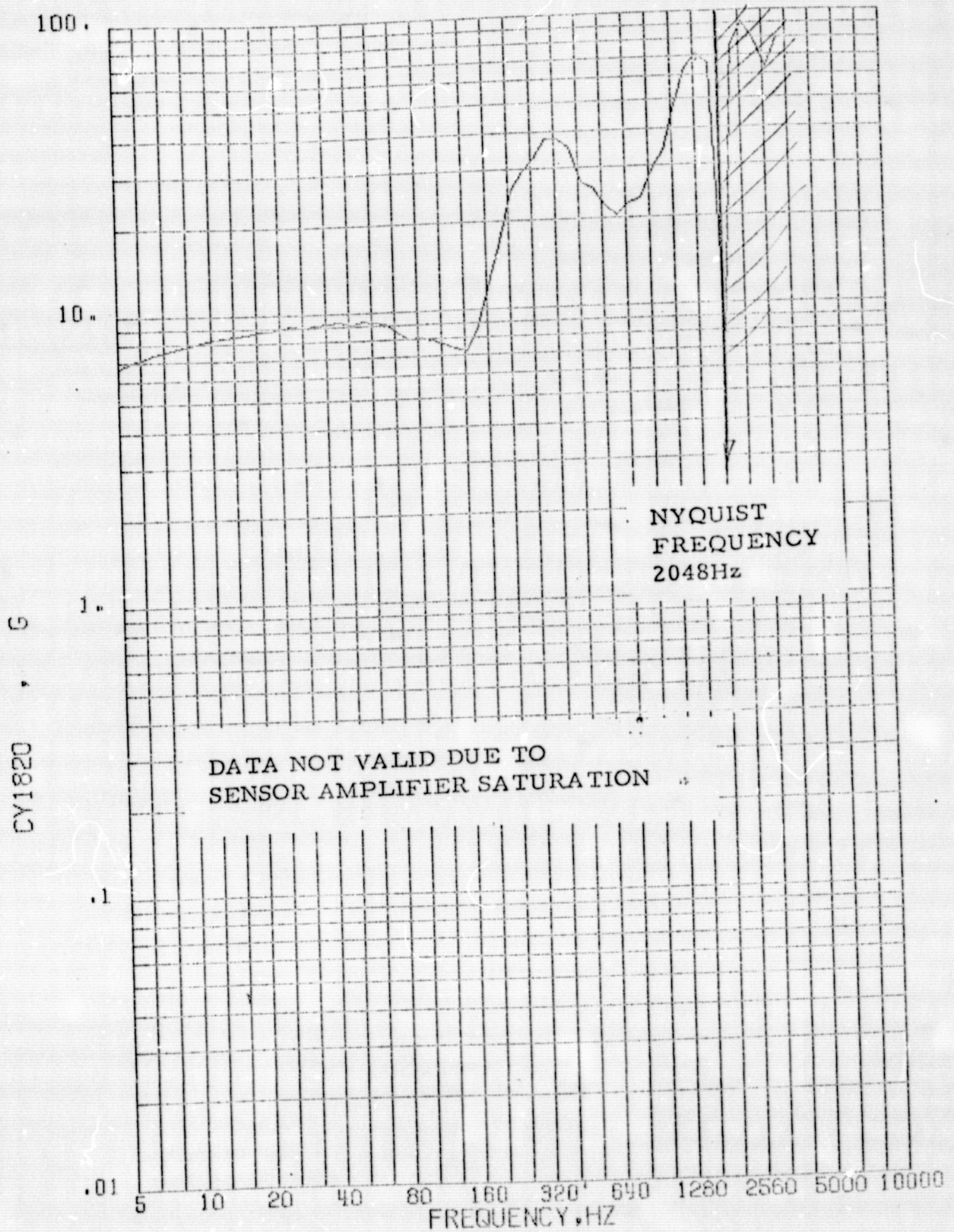
TITAN/CENTAR SEPARATION

681

3.109 9

4096

SHOCK SPECTRUM



START=77393.8000SEC.

STOP=77394.8000SEC.

Q=10.

VIKING A

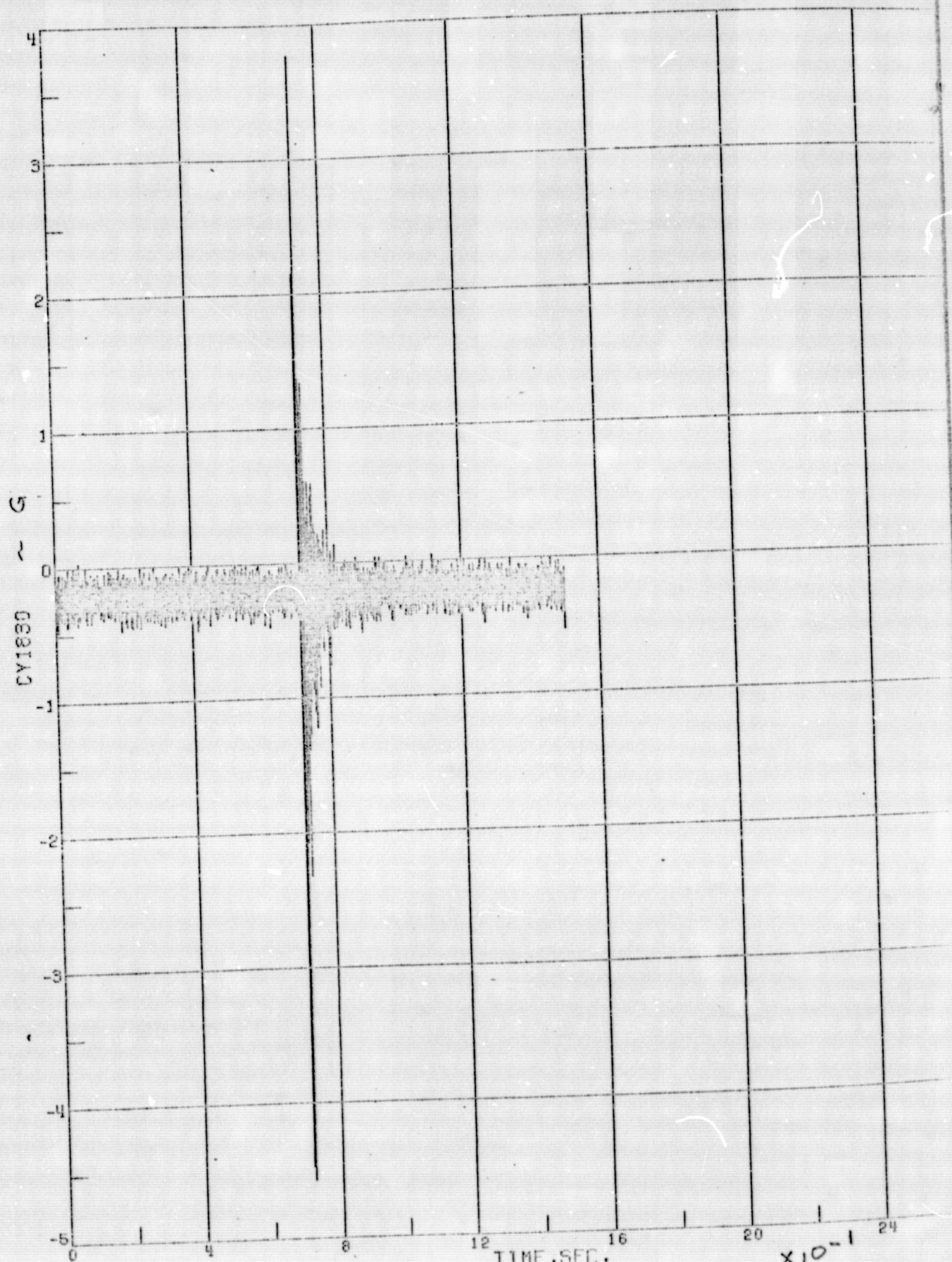
TI TAN/CENT SEPAR

8/ CY1820

GBJ

3, 3.110

Figure 3.54b



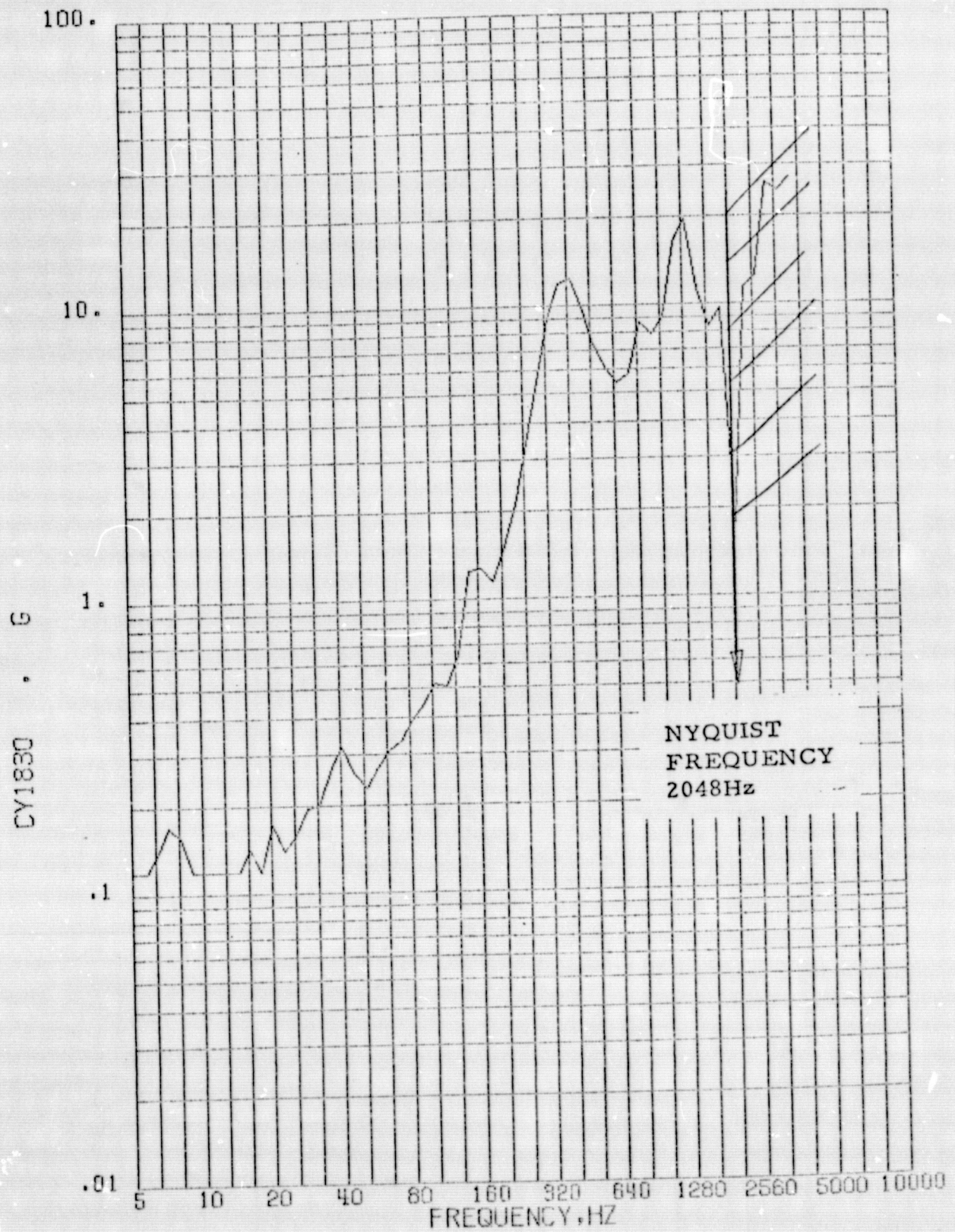
START=77393.3000SEC.

STOP=77394.8000SEC.

$\times 10^{-1}$

GBI

SHOCK SPECTRUM



START=77393.8000SEC.

STOP=77394.8000SEC.

Q=10.

VIKING A

TI TAN/CENT SEPAR

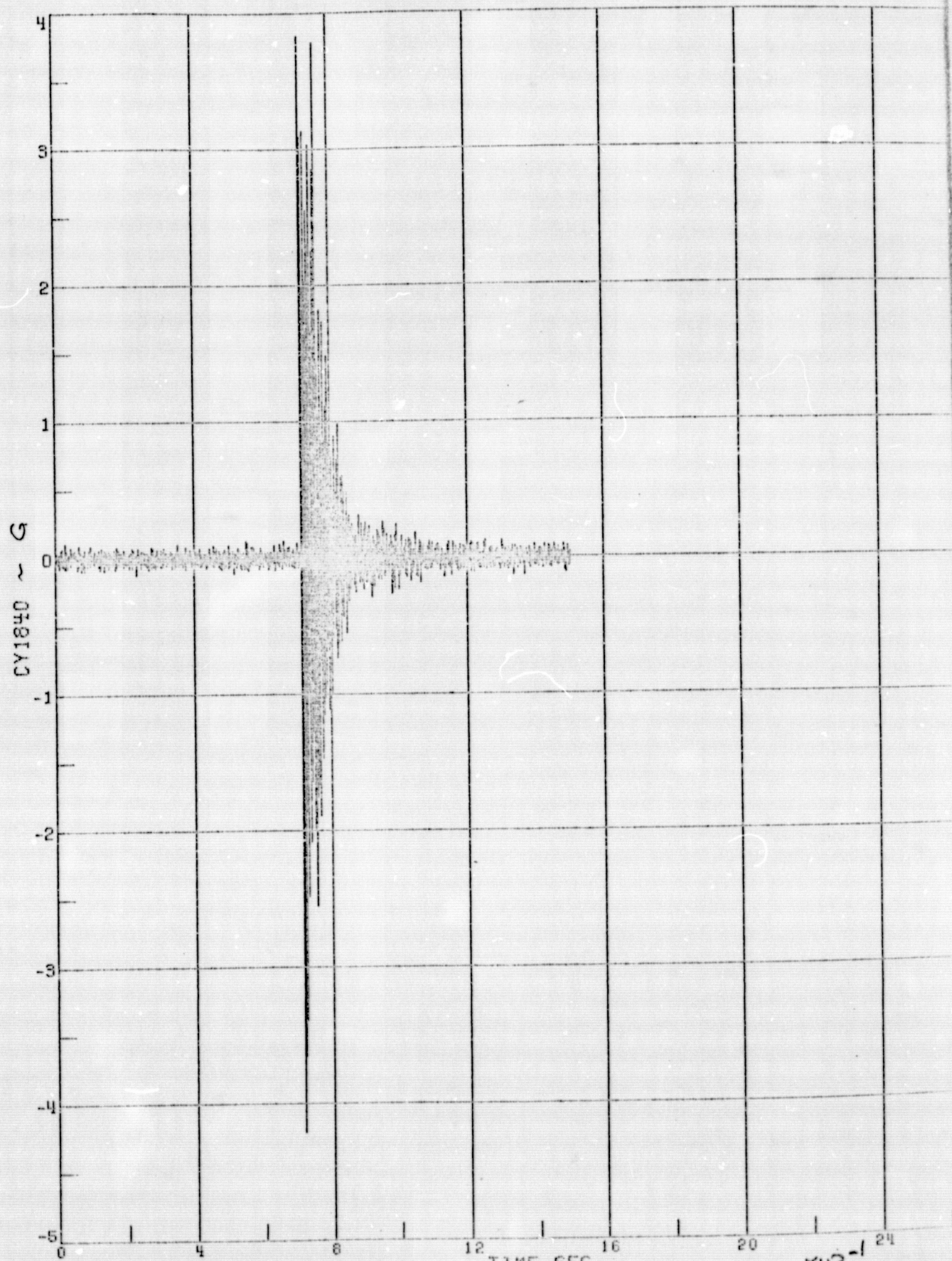
8/ CY1830

GBE

3.112

3.55 b

Figure 3.55b



START=77393.3000SEC.

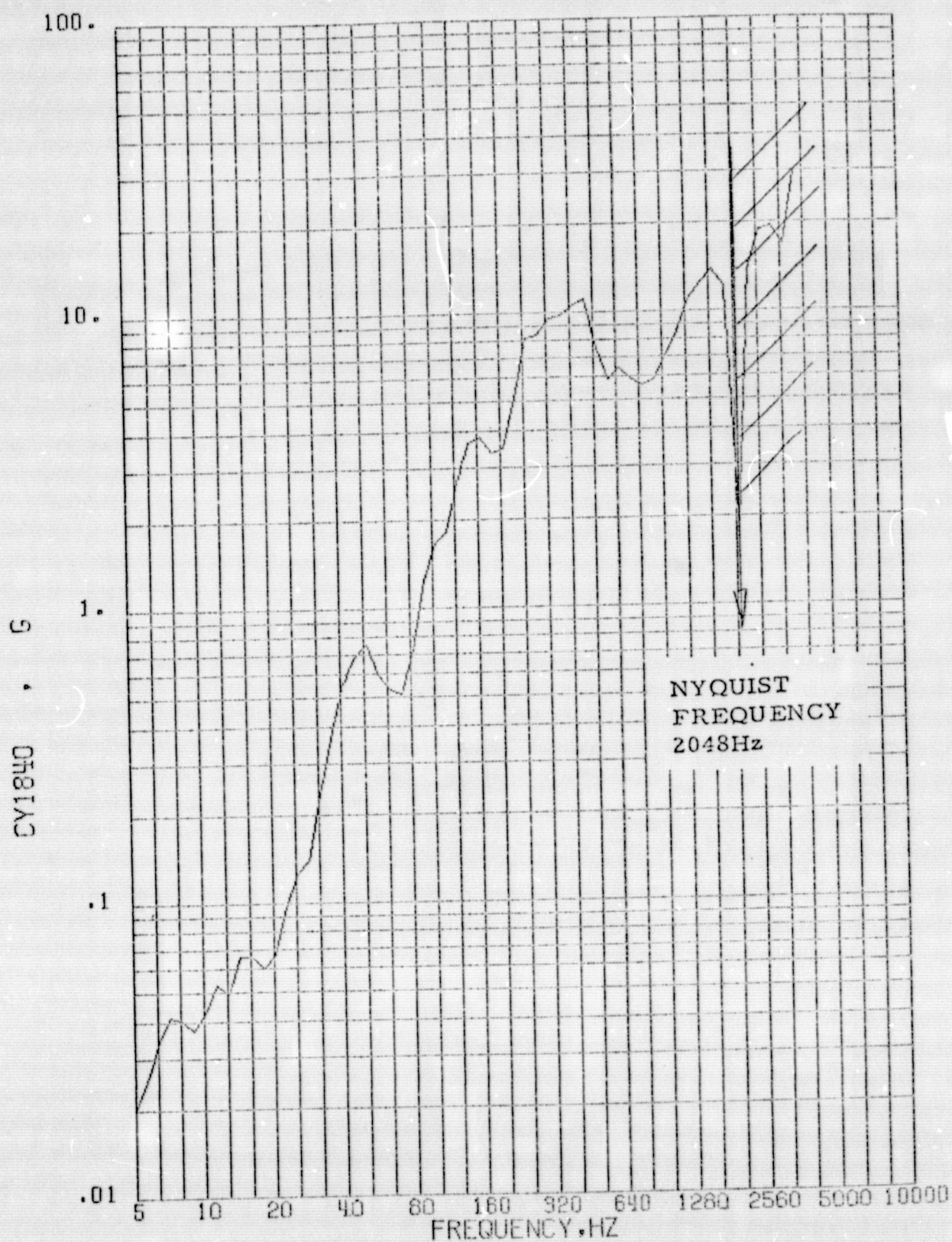
STOP=77394.8000SEC.

GB1

3.1139

Figure 3.56a

SHOCK SPECTRUM

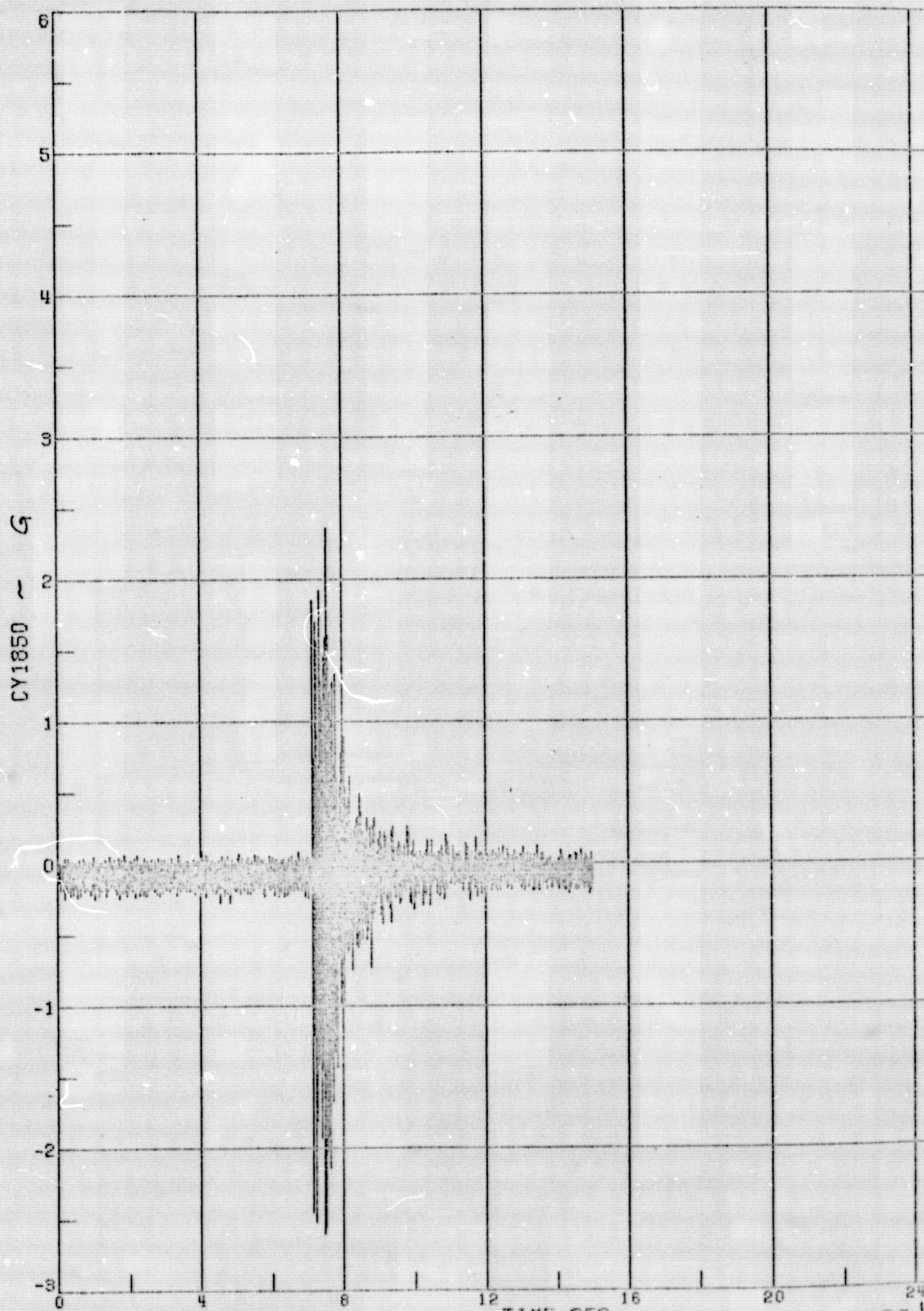


START=77393.8000SEC. STOP=77394.8000SEC. 0=10.
VIKING A 6B1 11 TAN/CENT SEPAR 8/ CY1040

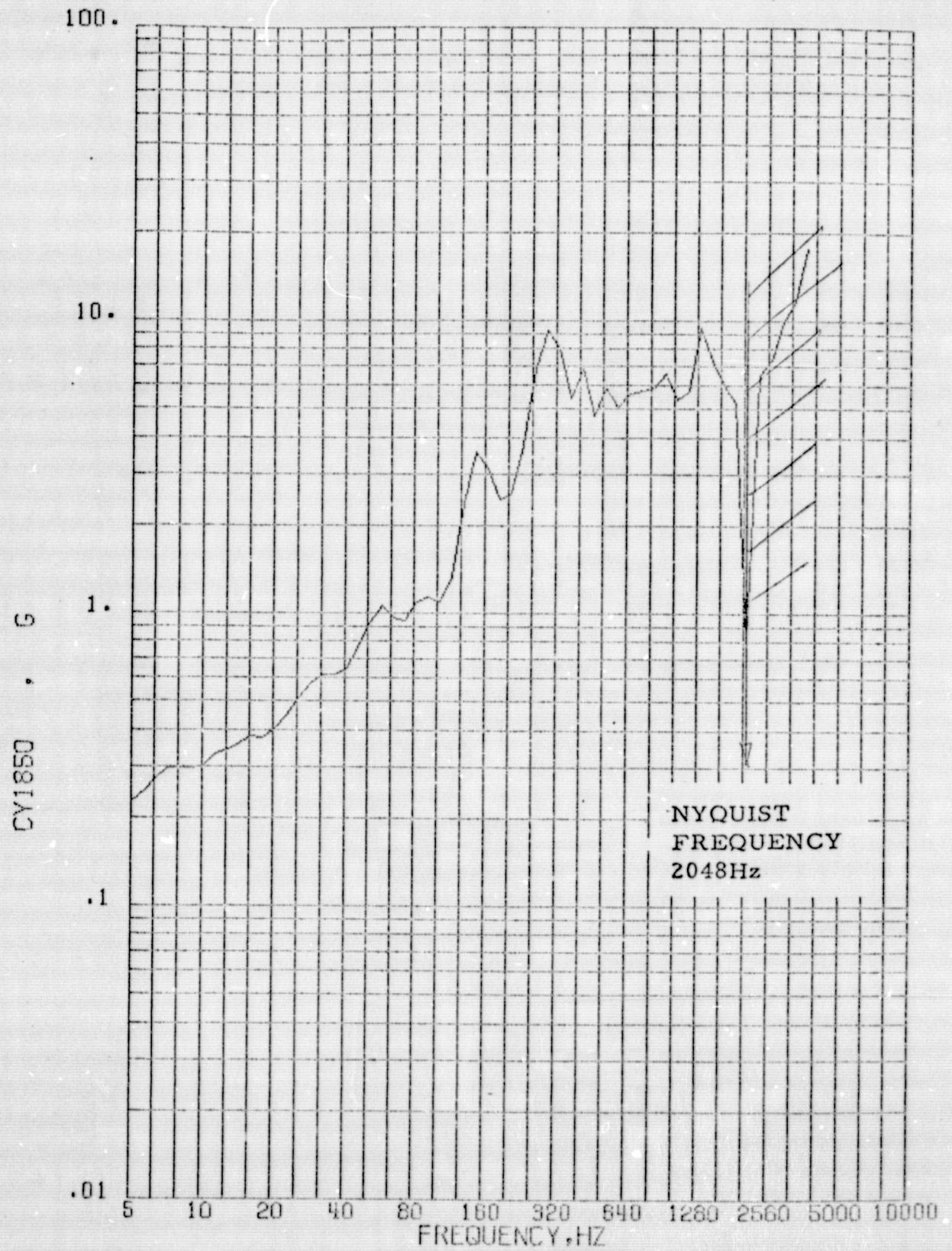
3.54b

3.114

Figure 3.56b



SHOCK SPECTRUM



START=77393.8000SEC.

STOP=77394.8000SEC.

0=10.

VIKING A

TI TAN/CENT SEPAR

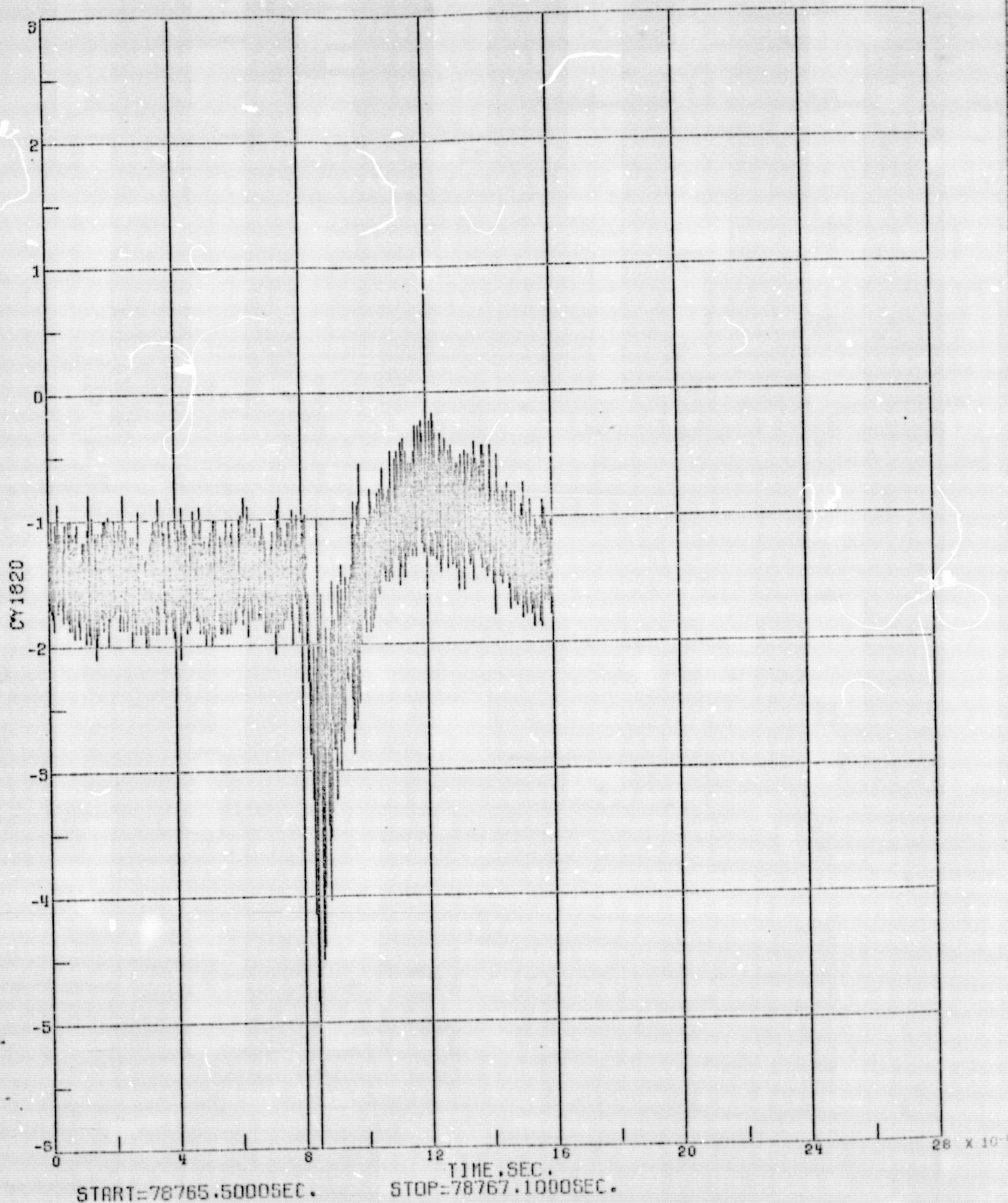
8/ CY1850

GBI

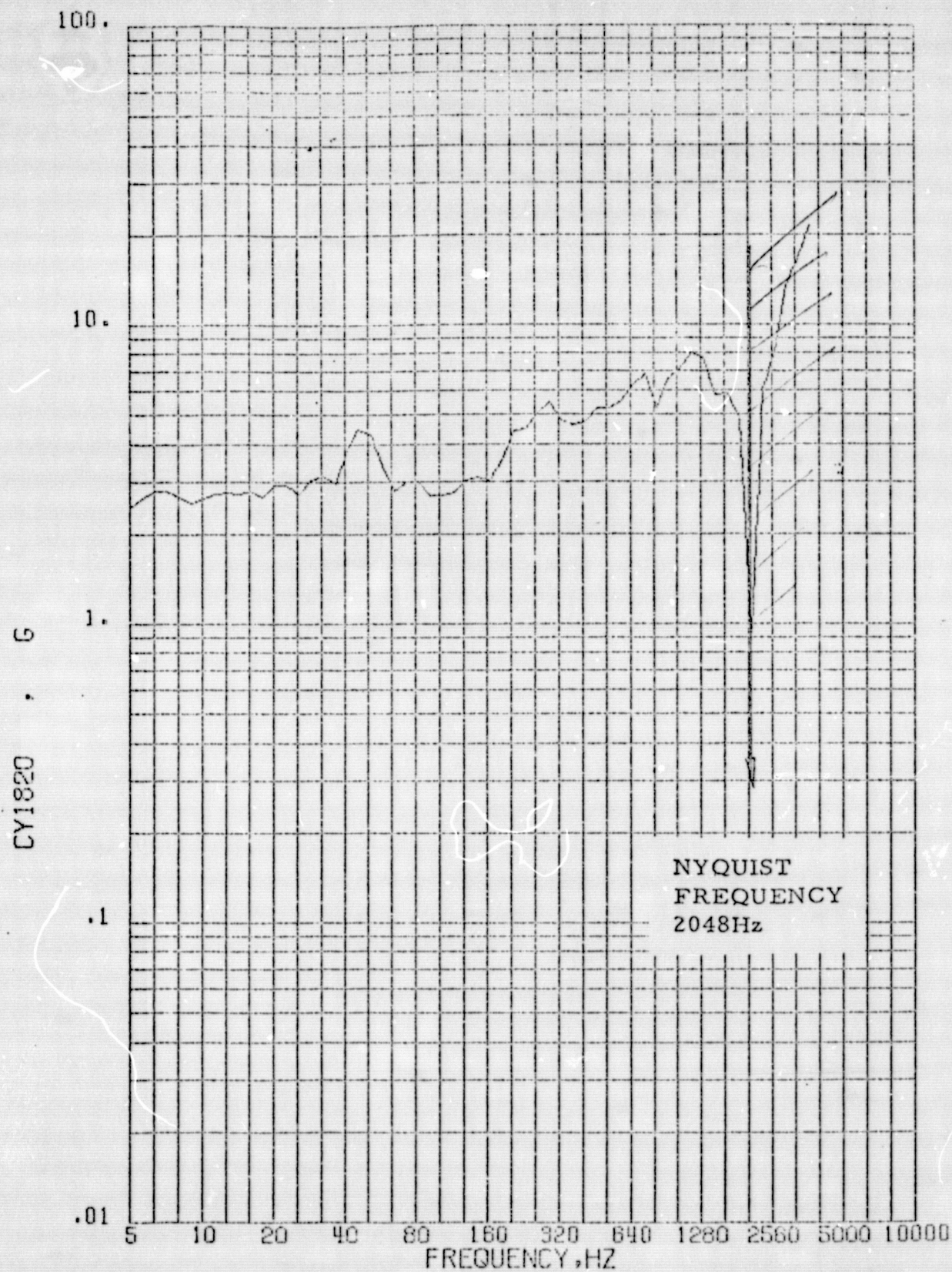
3.576

3.116

Figure 3.57b



SHOCK SPECTRUM



START=78766.1000SEC.

STOP=78767.1000SEC.

Q=10.

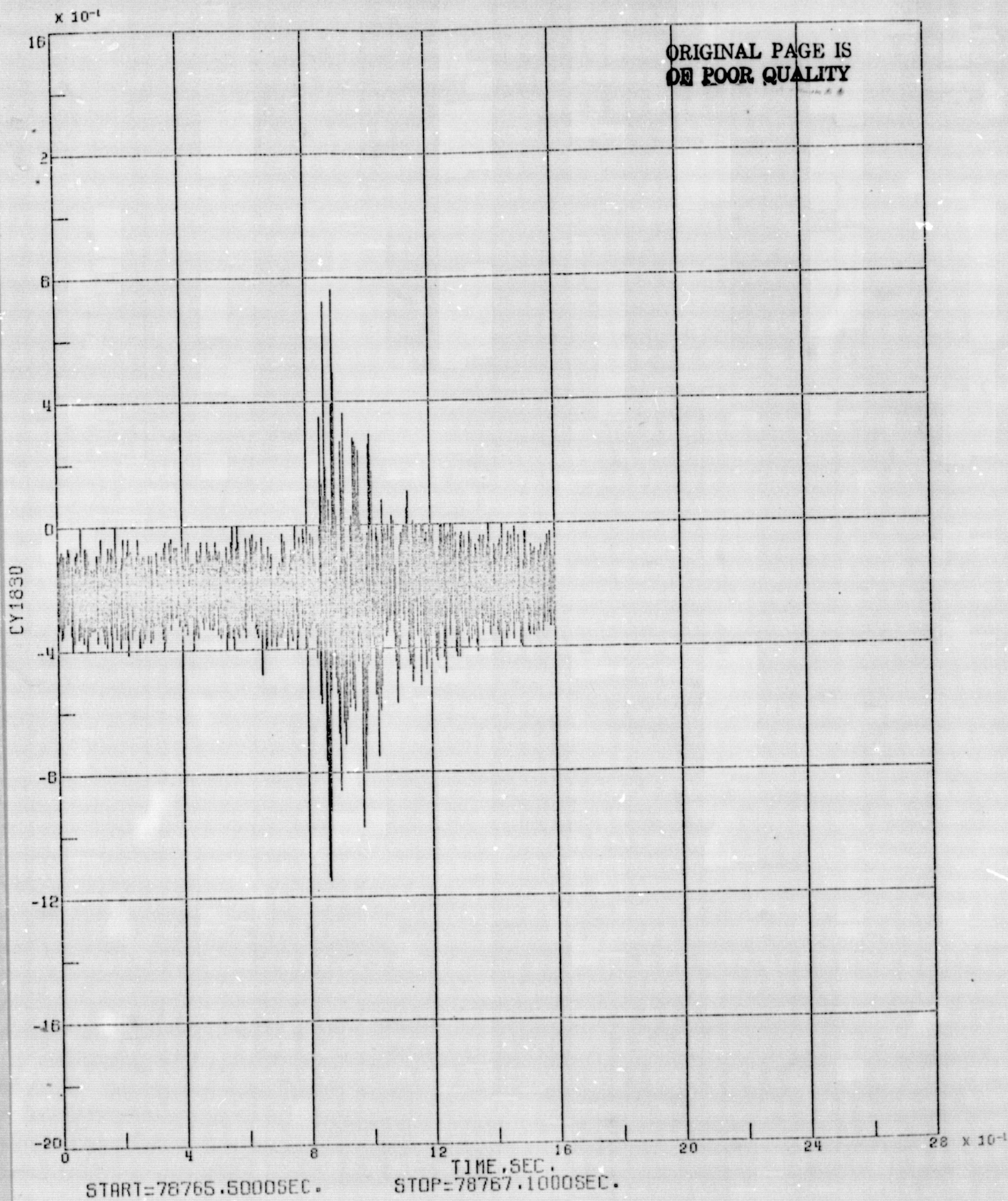
VIKING A

ME CO-2(JOBURG)

CY1820

3.118

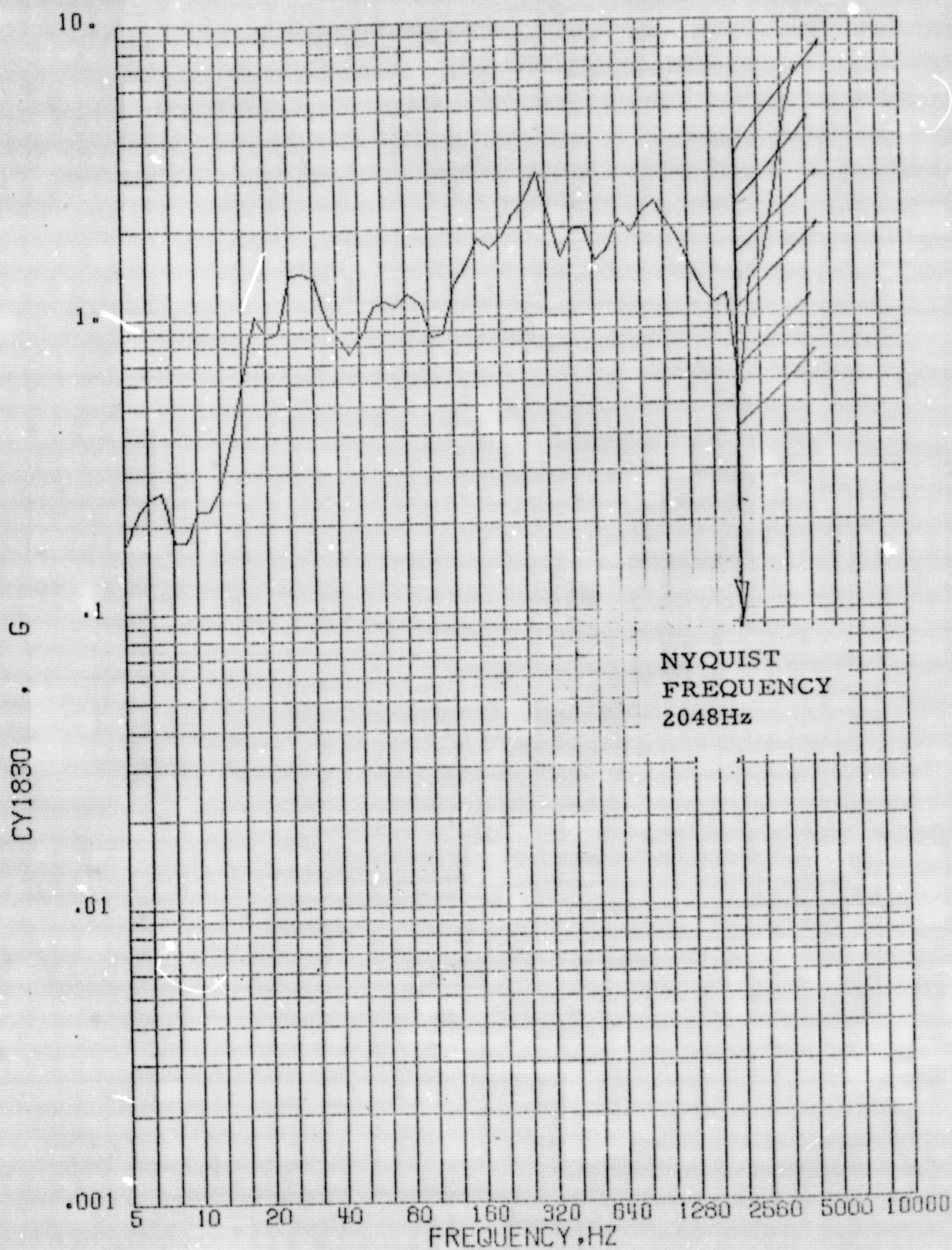
Figure 3.58b



3.119
3.59 a

Figure 3.59a

SHOCK SPECTRUM



START=78766.1000SEC.

STOP=78767.1000SEC.

0=10.

VIKING A

ME CO-2(JOBURG)

CY1830

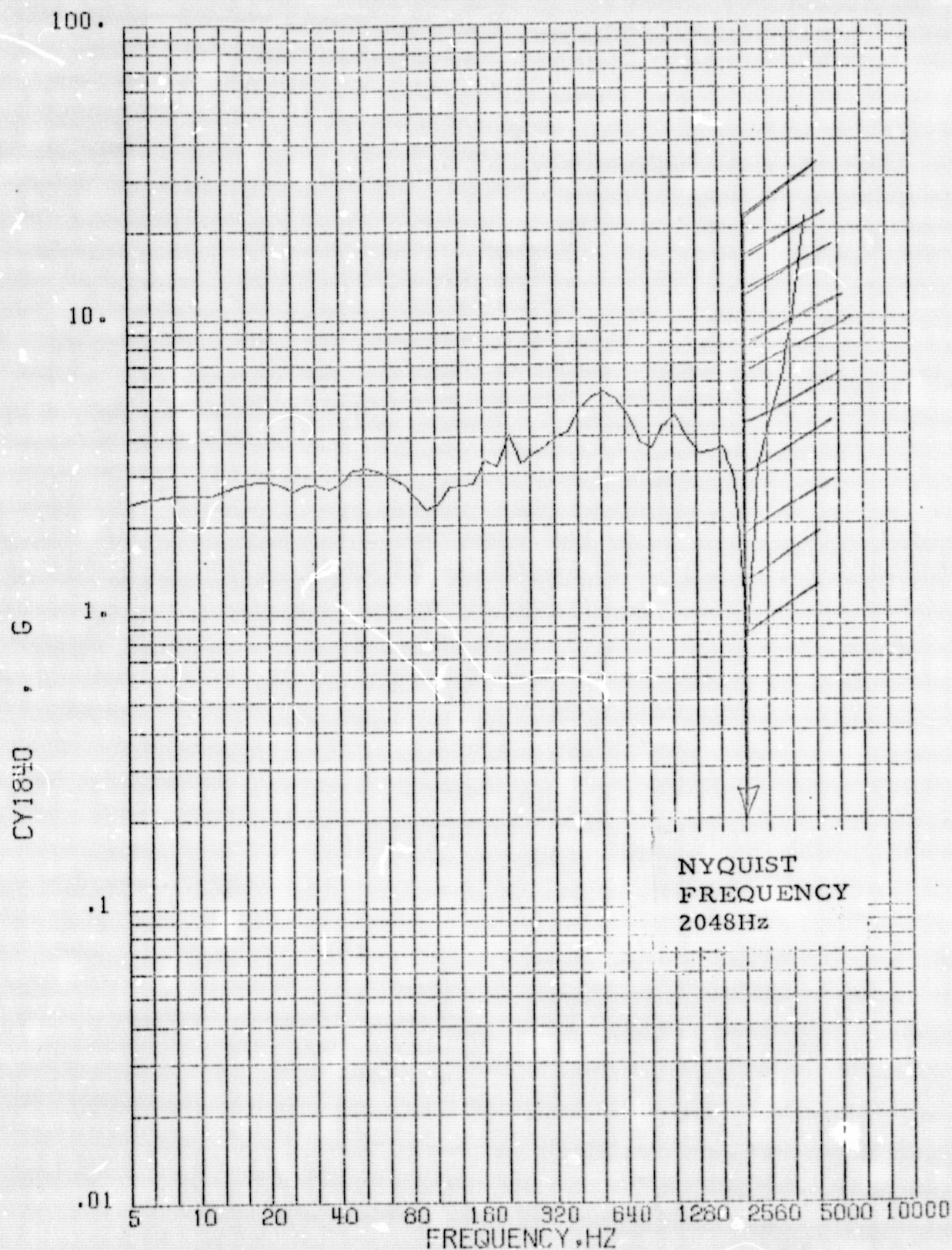
3.59b
3.120

Figure 3.59b



Figure 3.60a

SHOCK SPECTRUM



START=78766.1000SEC.

STOP=78767.1000SEC.

Q=10.

VIKING A

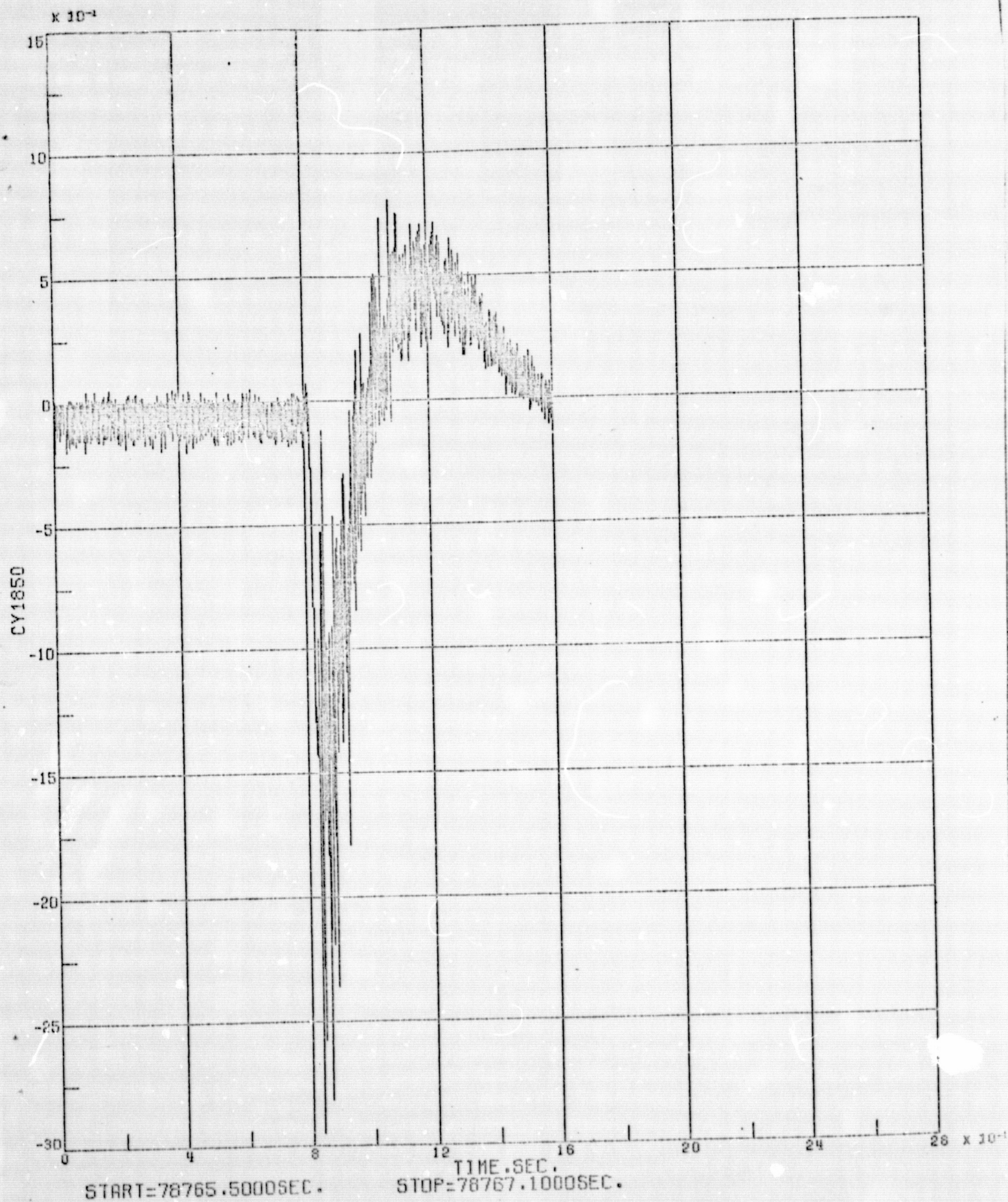
ME CO-2(JOBURG)

CY1840

3.60 b

3.122

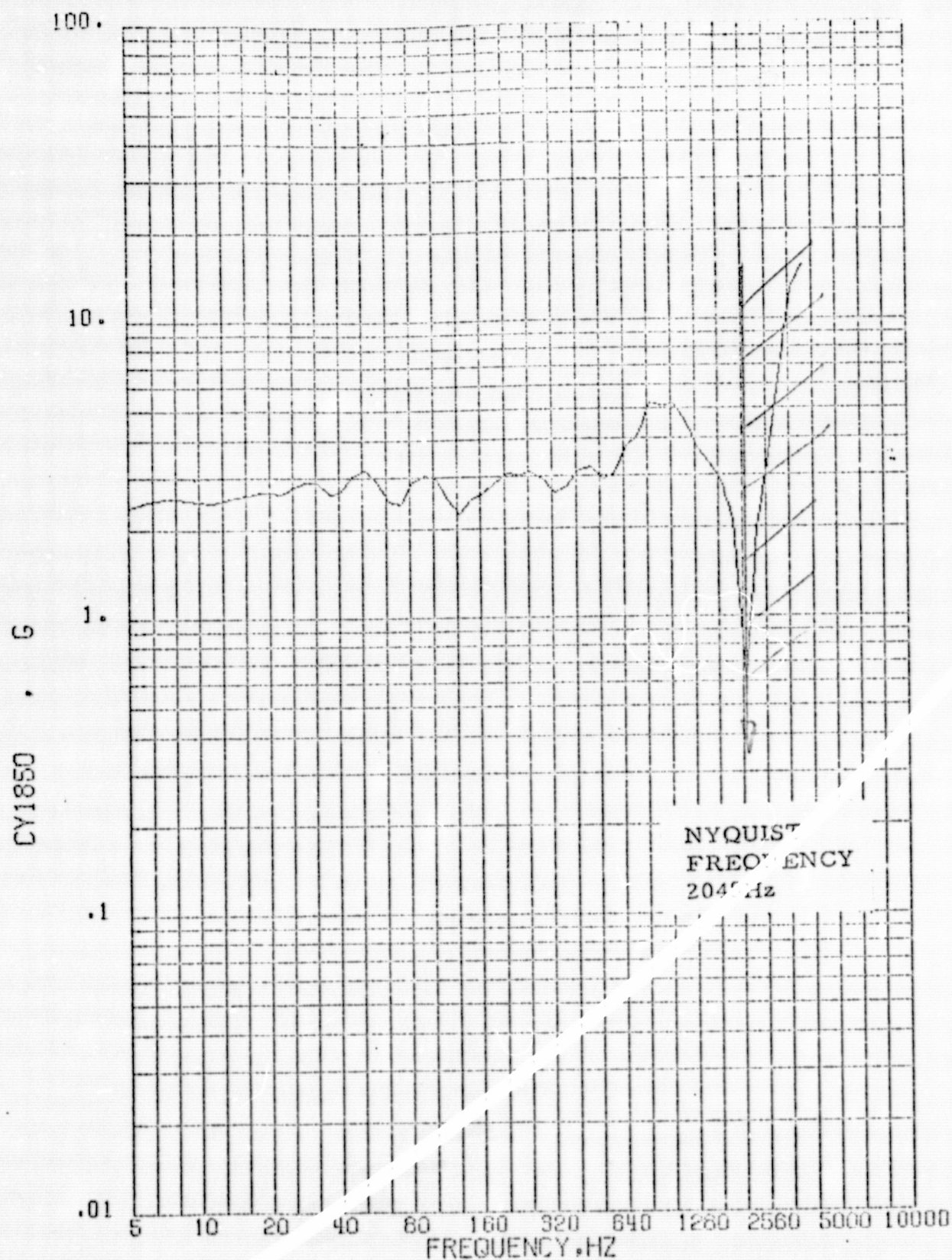
Figure 3.60b



3.123

Figure 3.61a

SHOCK SPECTRUM



START=78766.1000SEC.

STOP=78767.1000SEC.

0=10.

VIKING R

ME CO-2(JOSURG)

CY1850

3.124

Figure 3.61b